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A SKETCH OF THE HISTORY OF INDIAN BOTANY.*

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THE earliest reference in literature to Indian plants are, of course, those which occur in the Sanskrit classics. These are, however, for the most part, vague and obscure. The interest which these references have great as it may be, is not scientific, and they may therefore be omitted from consideration on the present occasion. The Portuguese, who were the first Europeans to appear in India as conquerors and settlers, did practically nothing in the way of describing the plants of their Eastern possessions. And the first contribution to the knowledge of the Botany of what is now British India was made by the Dutch in the shape of the 'Hortus Malabaricus,' which was undertaken at the instance of Van Rheede, governor of the territory of Malabar, which during the latter half of the seventeenth century had become a possession of Holland. This book, which is in twelve folio volumes and is illustrated by 794 plates, was published at Amsterdam between the years 1686 and 1703, under the editorship of the distinguished Botanist Commelyn. Van Rheede was himself only a Botanical amateur, but he had a great love of plants and most enlightened ideas as to the value of a correct and scientific knowledge of them. The 'Hortus Malabaricus' was based on specimens collected by Brahmins, on drawings of many of the species made by Mathæus, a Carmelite missionary at Cochin, and on descriptions originally drawn up in the vernacular language of Malabar, which were afterwards translated into Portuguese by Corneiro, a Portuguese official in Cochin, and from that language finally done into Latin by Van Douet. The whole of these operations were carried on under the general superintendence of Casearius, a missionary at Cochin. Of this most interesting work the plates are the best part; in fact, some of these are so good that there is no difficulty in identifying them with the species which they are intended to represent. The next important contribution to the Botanical literature of Tropical Asia deals rather with the plants of Dutch than of British India. It was the work of George Everhard Rumph (a native of Hanover), a physician and merchant, who for some time was Dutch consul at Amboina. The materials for this book were collected mainly by Rumphius himself, and the Latin descriptions and the drawings (of which there are over one thousand) were his own work. The book was completed in 1690, but it remained unpublished during the author's lifetime. Rumph died at Amboina in 1706, and his manuscript, after lying for thirty years in the hands of the Dutch East India Company, was rescued from oblivion by Professor John Burman, of Amsterdam (commonly known as the elder Burman), and was published under the title of 'Herbarium Amboinense,' in seven folio volumes, between the years 1741 and 1755. The illustrations of this work cover over a thousand species, but they are printed on 696 plates. These illustrations are as much inferior to those of Van Rheede's book as the descriptions are superior to those of the latter. The works of Plukenet, published in London between 1696 and 1705, in quarto, contain figures of a number of Indian plants which, although small in size, are generally good portraits, and therefore deserve mention in an enumeration of botanical books connected with British India. An account of the plants of Ceylon, under the name 'Thesaurus Zeylanicus,' was published in 1737 by John Burman (the elder Bruman), and in this work many of the plants which are common to that island and to Peninsular India are

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described. Burman's book was founded on the collections of Paul Hermann, who spent seven years (from 1670 to 1677) exploring the Flora of Ceylon at the expense of the Dutch East India Company. The nomenclature of the five books already mentioned is all uni-nominal.

Hermann's Cingalese collection fell, however, sixty years after the publication of Burman's account of it, into the hands of Linnæus, and that great systematist published in 1747 an account of such of the species as were adequately represented by specimens, under the title 'Flora Zeylanica.' This Hermann Herbarium, consisting of 600 species, may still be consulted at the British Museum, by the trustees of which institution it was acquired, along with many of the other treasures possessed by Sir Joseph Banks. Linnæus's 'Flora Zeylanica' was followed in 1766 by the 'Flora Indica' of Nicholas Burman (the younger Burman)—an inferior production, in which about, 1,500 species are described. The Herbarium on which this 'Flora Indica' was founded now forms part of the great Herbarium Delessert at Geneva.

The active study of Botany on the binominal system of nomenclature invented by Linnæus was initiated in India itself by Koenig, a pupil of that great reformer and systematist. It will be convenient to divide the subsequent history of Botanic science in India into two periods, the first extending from Koenig's arrival in India in 1768 to Sir Joseph Hooker's arrival in 1848; and the second from the latter date to the present day.

The pioneer John Gerard Koenig was a native of the Baltic province of Courland. He was a correspondent of Linnæus, whose pupil he had formerly been. Koenig went out to the Danish Settlement at Tranquebar (150 miles south of Madras) in 1768, and at once began the study of Botany with all the fervour of an enthusiasm which he succeeded in imparting to various correspondents who were then settled near him in Southern India. These friends formed themselves into a society under the name of 'The United Brothers,' the chief object of their union being the promotion of Botanical study. Three of these brothers, viz. Heyne, Klein and Rottler, were missionaries located near Tranquebar. Gradually the circle widened, and before the century closed, the enthusiasm for Botanic research had spread to the younger Presidency of Bengal, and the number of workers had increased to about twelve, among whom may be mentioned Fleming, Hunter, Anderson Berry, John, Roxburgh, Buchanan (afterwards Buchanan-Hamilton), and Sir William Jones, so well known as an Oriental scholar. At the first it was the custom of this brotherhood merely to exchange specimens, but gradually names began to be given, and specimens, both named unnamed, began to be sent to Botanists of established reputation in Europe. Many plants of Indian origin came thus to be described by Retz, Roth, Schrader, Wildenow, Vahl, and Smith. Rottler was the only member of the band who himself published in Europe descriptions of any of the new species of his own collecting, and these appeared in the 'Nova Acta Acad. Nat. Curiosorum' of Berlin. A little later Sonnerat and other Botanists of the French Settlement at Pondicherry sent large collections of plants to Paris, and these were followed at a considerably latter date by the collections of Leschenhault. These French collections were described chiefly by Lamarck and Poiret. Hitherto Botanical work in India had been more or less desultory, and it was not until the establishment in 1787 of the Botanic Garden at Calcutta that a recognised centre of Botanical activity was established in British India. Robert Kyd, the founder of that Garden, was more of a gardener than a Botanist. He was, however, a man of much energy and shrewdness. The East India Company was still in 1787 a trading company, and a large part of their most profitable business was derived from the nutmegs and other spices exported from their settlements in Penang, Malacca, Amboina, Sumatra, and other islands of the Malayan Archipelago. The Company were also in those days the owners of a fine fleet of sailing vessels, and the teak of which these ships were built had to be obtained from sources outside the Company's possessions. The proposal to found a Botanic Garden near Calcutta was thus recommended to the Governor of the Company's settlements in Bengal on the ground that, by its means, the cultivation of teak and of the Malayan spices might be introduced into a province near one of the Company's chief Indian centres. Kyd, as a Lieutenant-Colonel of the Company's engineers and as Secretary to the Military Board at Calcutta, occupied a position of considerable influence, and his suggestion evidently fell on no unwilling ears; for the Government of Bengal, with the promptitude to accept and to act on good advice in scientific and semi-scientific matters which has characterised them from the day of Kyd until now, lost no time in taking steps to find a site for the proposed garden. Colonel Kyd's official proposal was dated June 1, 1786 and, in a despatch dated August 2, Calcutta Government recommended Kyd's proposal to the Court of Directors in London. Posts were slow and infrequent in those days, and the Calcutta Government were impatient. They did not wait for a reply from Leadenhall Street, but in the following July they boldly secured the site recommended by Colonel Kyd. This site covered an area of 300 acres, and the whole of it with the exception of thirty acres which were subsequently given up to Bishop Middleton for an English college, still continues under cultivation as a Botanic Garden. Kyd died in 1793, and in the same year his place as Superintendent of the Garden was taken by Dr. William Roxburgh, a young Botanical enthusiast, and one of Koenig's 'United Brotherhood.' Roxburgh had studied Botany in Edinburgh, where he was a favourite pupil of Dr. Hope. Desirous of seeing something of foreign countries, he made several voyages to Madras in ships belonging to the Honourable East India Company. In 1776 he accepted an appointment in the Company's Medical Establishment, and was posted to the town of Madras, where he very soon made the acquaintance of Koenig. Roxburgh was shortly after transferred to a remote district, a good deal to the north of Madras, then named the Northern Circars. The station of Samalcotta, which formed Roxburgh's headquarters during his sojourn in the Circars, stands on the edge of a hilly region possessing a very interesting Flora, and this Flora, he explored with the greatest ardour; and as part of the result of his labours an account some of the most interesting of its plants was published in London, at the East India Company's expense, in three large folio volumes under the title 'The plants of the Coast of Coromandel.' This was Roxburgh's earliest publication on a large scale. The first part of this book appeard in 1795, and the last not until 1819, *i.e.* five years after the author's death. The increased facilities afforded to Roxburgh after his transfer to a comparatively well-equipped institution like that at Calcutta induced him at once to begin the preparation of descriptions of all the plants indigenous to British India of which he could procure specimens. And so diligently did he work that, when he was finally driven from India by ill-health in 1813, he left complete and ready for publication the manuscripts of his 'Flora Indica' and of his 'Hortus Bengalensis' (the latter being an enumeration of the plants in cultivation in the Culcutta Garden). He also left admirable coloured drawings (mostly of natural size) of 2,533 species of plants indigenous to India. Seldom have twenty years yielded so rich a Botanical harvest! Dr. Roxburgh was thus the first Botanist who attempted to draw up a systematic account of the plants of India, and his book, which is on the Linnæan system, is the basis of all subsequent works on Indian Botany; and until the publication of Sir Joseph Hooker's monumental 'Flora of British India' it remained the only single book through which a knowledge of Indian plants could be acquired. Roxburgh was immediately succeeded in the Calcutta Garden by Dr. Buchanan, Hamilton, a man of many accomplishments, who had travelled from Nepal in the North to Ava and

Mysore in the South, accumulating materials for a Gazetteer of the Honourable Company's possessions. Dr. Buchanan was a Zoologist as well as a Botanist. He had published a valuable account of Mysore, Canara, and Malabar, and had collected materials for a work on the Fishes of India, besides having accumulated a large Herbarium, part of which may now be consulted at the University of Edinburgh. Prior to his death Buchanan-Hamilton had begun to write a learned commentary on Van Rheede's 'Hortus Malabaricus.' Many of his Nepalese collections were described in 1825 (a few years before his own death) by Don in his 'Prodromus Floræ Nepalensis.' Buchanan-Hamilton remained only one year at Calcutta, and in 1815 he was succeeded by Nathaniel Wallich, a native of Copenhagen, who, prior to his appointment to the Calcutta Garden, had been attached as surgeon to the Danish settlement at Serampore, twenty miles higher up the Hooghly. Wallich remained Superintendent of the Calcutta Garden for thirty years. In 1846 he went to England, and in 1854 he died. During his tenure of office in the Calcutta Garden, Wallich organised collecting expenditions to the then little-known regions of Kamaon and Nepal (in the Himalaya), to Oudh, Rohilcund, Sylhet, Tenasserim, Penang, and Singapore. He personally undertook in fact a botanical survey of a large part of the Company's possessions in India. The vast materials thus collected under his own immediate direction, and the various contributions made by others, were taken to London by him in 1828. With these were subsequently incorporated the collections of Russell, Klein, Heyne, Rottler, Buchanan-Hamilton, and Roxburgh. And by the help of a band of distinguished European Botanists, among whom may be named De Candolle, Kunth, Lindley, Meissner, Nees von Esenbeck, Von Martius, and Bentham (the latter in a very special manner), this vast mass of material was classified and named specifically. A catalogue of the collection was prepared by Wallich himself (largely aided by Bentham), and sets of the named specimens were distributed to the leading Botanical institutions in Europe, every example of each species bearing the same number. No description of the whole collection was ever attempted, but many of the plants belonging to it were subsequently described in various places and at various times. So extensive was the Wallichian distribution that, amongst the names and synonyms of tropical Asiatic plants, no citation is more frequent in Botanical books than that of the contraction 'Wall. Cat.' Besides the naming and distribution of this gigantic collection, Wallich prepared and published, at the expense of the same liberal and enlightened East India Company, his 'Plantæ Asiaticæ Rariores,' in three folio volumes with 300 coloured plates. He also contributed to an edition of Roxburgh's 'Flora Indica,' which was begun by the celebrated Dr. Carey of Serampore, descriptions of many plants of his own collecting. But the task of publishing his discoveries in this way proved beyond his powers, as it would have proved beyond those of any one who had only 365 days to his year, and less than a hundred years as his term of life! Carey and Wallich's edition of Roxburgh's 'Flora Indica' was brought to an untimely conclusion at the end of the *Pentandria Monogynia* of Linnæus. Wallich also began an illustrated account of the Flora of Nepal under the title 'Tentamun Floræ Napalensis.' But this also came to a premature end with the publication of its second part.

During much of the time that Wallich was labouring in Northern India, Robert Wight; a botanist of remarkable sagacity and of boundless energy, was labouring in Southern India, chiefly in parts of the Peninsula different from those in which Koenig and his band had worked. Wight was never liberally supported by the Government of Madras, and it was mostly by his own efforts and from his own resources that his collections were made, and that his Botanical works were published. The chief of the latter is his 'Icones Plantarum.' This book consists of figures with descriptions of more than two thousand Indian species. A good many of the plates are indeed copies from the suite of drawings already referred to as having been made at Calcutta by Dr. Roxburgh. The rest are from drawings made by native artists under his personal supervision. Ample evidence of the extraordinary energy of Dr. Wight is afforded by the facts that, although he had to teach the native artists whom he employed both to draw and to lithograph, the two thousand *Icones* which he published and described were issued during the short period of thirteen years, and that during the whole of this time he performed his official duties.

Besides this *magnum opus* Wight published his *Spicilegium Nilghirense* in two vols. quarto, with 200 coloured plates. And between 1840 and 1850 he issued in two vols. quarto, with 200 plates, another book named 'Illustrations of Indian Botany,' the object of which was to give figures and fuller descriptions of some of the chief species described in a systematic book of the highest Botanical merit, which he prepared conjointly with Dr. G. A. Walker-Arnot, Professor of Botany in the University of Glasgow, and which was published under the title 'Prodromus Floræ Peninsulæ Indicæ.' The 'Prodromus' was the first attempt at a Flora of any part of India in which the natural system of classification was followed. Owing to various causes, this work was never completed, and this splendid fragment of a Flora of Peninsular India ends with the natural order *Dipsaceæ*.

The next great Indian botanist whose labours demand our attention is William Griffith. Born in 1810, sixteen years after Wight, and twenty-four years later than Wallich, Griffith died before either. But the labours even of such devotees to science as were these two are quite eclipsed by those of this most remarkable man. Griffith's Botanical career in India was begun in Tenasserim. From thence he made Botanical expeditions to the Assam valley, exploring the Mishmi, Khasia, and Naga ranges. From the latter he passed by a route never since traversed by a Botanist, through the Hookung valley down the Irrawadi to Rangoon. Having been appointed, soon after his arrival in Rangoon, surgeon to Pemberton's Embassy to Bhotan, he explored part of that country, and also sent collectors into the neighbouring one of Sikkim. At the conclusion of this exploration he was transferred to the opposite extremity of the Northern frontier, and was posted to the Army of the Indus. After the subjugation of Cabul, he penetrated to Khorassan. Subsequently he visited the portion of the Himalaya of which Simla is now the best-known spot. He then made a run down the Nerbudda valley in Central India, and finally appeared in Malacca as Civil Surgeon of that Settlement. At the latter place he soon died of an abscess of the liver brought on by the hardships he had undergone on his various travels, which were made under conditions most inimical to health, in countries then absolutely unvisited by Europeans. No Botanist ever made such extensive explorations, nor himself collected so many species (9,000), as Griffith did during the brief thirteen years of his Indian career; none ever made so many field notes or wrote so many descriptions of plants from living specimens. His Botanical predecessors and contemporaries were men of ability and of devotion. Griffith was a man of genius. He did not confine himself to the study of flowering plants, nor to the study of them from the point of view of their place in any system of classification. He also studied their morphology. The difficult problems in the latter naturally had most attraction for him, and we find him publishing, in the 'Linnæan Transactions,' the results of his researches on the ovule in *Santalum*, *Loranthus*, *Viscum*, and *Cycas*. Griffith was also a cryptogamist. He collected, studied, and wrote much on Mosses, Liverworts, *Marsiliaceæ*, and Lycopods, and he made hundreds of drawings to illustrate his microscopic observations. Wherever he travelled he made sketches of the most striking features in the scenery. His

habit of making notes was inveterate; and his itinerary diaries are full of information not only on the Botany, but also on the zoology, physical geography, meteorology, archæology, and agriculture of the countries through which he passed. His mannscripts and drawings, although left in rather a chaotic state, were published after his death under the editorship of Dr. McClelland, at the expense of the enlightened and ever-liberal East India Company. They occupy six volumes in octavo, four in quarto, and one (a 'Monograph of Palms') in folio.

Another Botanist of much fame, who died prematurely in 1822, after an Indian career of only nine years, was Dr. William Jack. In 1814-15 Jack accompanied Ochterlony's army to the Nepal terai. He was transferred in 1818 to the Company's Settlement in Sumatra under Sir Stamford Raffles, and during the four years of his residence in Sumatra he contributed to Botanical literature descriptions of many new genera and species which were published in his 'Malayan Miscellanies.' His collections, unfortunately, were for the most part lost by an accident, but those which were saved are now in the Herbarium Delessert in Geneva,

(*To be continued.*)

COTTON CULTIVATION.

The following is the translation of an article specially contributed to the *Egyptian Gazette* by M. Y. K. Agathon, farm manager to H. E. Boghos Pasha Nubar:—

In accordance with your laudable desire to point out to land owners who grow cotton the means which science and agricultural experience show to be necessary to fight against or at least attenuate the disastrous effects which the scarcity of water this year might occasion, I will hear trace some of the means which each might employ. My own personal opiuion with regard to the bad condition of the Nile, is that a large number of laud-holders will lose the whole of their cotton crop.

In order to allow the cotton plant to resist without water for a reasonably long time I would give the following bits of advice to cultivators:

1. On sweet lands (*Ard Helou*), it is necessary to plough well into the ground. For this purpose European ploughs might be employed. If these are not available, the native plough (*Mihrat Beledi*) may be dragged over the furrow which has already been opened by the same instrument. The effect of this deep ploughing will be to allow the roots of the cotton plant to penetrate rapidly into the sub-soil, which, being always damp, will furnish the water necessary for cultivation.

It has often been remarked in Europe, especially in the south of France, in Italy, and in Algeria, that during years of drought good crops were always obtained on lands which had been deeply ploughed, whilst on those superficially ploughed the crop was almost nil.

2. Sow cotton seed as soon as the climate of the region allows of it, as the plant, sown in time and, not suffering from scarcity of water in the first phases of its vegetation, will send out numerous and deep roots which might well resist the dearth of water when the time of drought of long duration comes.

3 Dress and weed out the cotton fields as often as possible. It is usual to give three second dressings to the cotton plant during its vegetation, but I think that this year five and even six second dressings should be given. A popular adage has it that "two dressings are worth one watering or one dressing is equivalent to half a watering." This dictum is quite right as by dressing the earth we destroy the cappilarity of the soil, the effect of which is to "pump" its humidity. On clay lands in Lower Egypt, in about ten days after irrigation the earth cracks and shows fairly wide crevices; the strong rays of the sun penetrating into these crevices quickly evaporate the little humidity which the soil possesses, but when the earth is dressed frequently, these crevices no longer show, and owing to the solar rays in June aud July—the most critical time for cotton —not having any more hold on the sub-soil, the humidity which remains there prevents the drying-up, and, in consequence, the d ath of the plant.

4. When in June and July it is known that owing to the programme of rotation the cotton-fields will remain for 40 or 50 days without water on estates where there are chips or reeds, I would suggest that after irrigation the surface of the soil should be covered with a light bed of chips or reed. This bed would form a sort of shade, the earth begin no longer uncovered, the evaporation of the soil would be prevented, and the water given with the last irrigation would allow the plant to vegetate about fifty days without watering.

5. The digging of sakich wells might render great services on lands where water may be obtained pretty abundantly to a depth of five to six metres. Half a watering furnished by the sakieh might in certain cases save the crop, which otherwise would be lost without fail. I have myself just had recourse to this means. At Seguine near Mehallet Roh at a depth of six metres the water spouted out, like the creater of a volcano, and in less than half-an-nour the whole of the well, whose holding capacity was 300 metres, was filled with water.

These are a few means which I modestly put before Egyptian cultivators. The country, happily, does not lack in enlightened agriculturists much more qualified than I am, and if each of them, in the interest of the public, would indicate through the medium of the Press the means, other than those I have given here, of remedying the disastrous effect of the scarcity of water, he would assuredly render an inestimable service to the country. I trust that your confreres of Alexandria and Cairo will follow your laudable example and will themselves make an appeal to the enlightenment of agriculturists to save the country from a disaster without precedent in the history of Egyptian Agriculture in this century.—*Egyptian Gazette*, March 3.

BURNING WEEDS.

It is a mistake to let weeds go to seed in the garden or around the farm, under the impression that they can be destroyed if gathered in the fall and burned. In the first place, the job is apt to be forgotten until most of the weed seeds have been scattered. Even if a weed is burned its seeds may not be destroyed, unless a hot fire of brush is first made and the weed seeds are thrown on a mass of burning coals. If weeds are piled in heaps they burn slowly, and, as the seed falls to the ground it is protected from burning by the stratum of carbonic-acid gas that is found at the bottom of all slow-burning fires.—*American Cultivator.*

A LOUSE-PROOF ROOST.

The accompanying diagram from the *American Agriculturist* depicts a ratting good idea for protecting hen-roosts from invation by lice or ticks, which are becoming so troublesome in many parts of this Colony. The plain is simply to suspend the roosts with wire, as recommended a little time ago by Mr. McCue; but, instead of using, as he suggests, a bit of keroseney rag, get an old jam tin soldered on to each wire, forming a cup which can be kept filled with crude or pure kerosene, or even greasy water. The same arrangement might be used for hanging safes, to prevent the inroads of ants.—*Agricultural Gazette.*

COLOMBO SALES OF CEYLON TEA AND AVERAGES FOR 1899.*

Estate.	Quantity Sold. lb.	Average Price. c.
Agra Ouvah	389000	51
Vogan	344100	38
Polatagama	322000	37
Glasgow	320100	51
Rayigam	312800	35
Pallegoda	29[illegible]000	40
Brownlow	284000	42
High Forest	270000	50
Ganapalla	259600	36
Harangalla	256200	37
Bandara Eliya	255600	40
Weyungawatte	255500	37
Myraganga	245600	37
Middleton	241000	51
Eila	240780	36
Glentilt	237350	45
Knavesmire	234000	38
Maha Ouvah	233700	43
Glassaugh	232[illegible]00	44
Hayes	232000	41
Tonacombe	230700	44
Arapolakanda	230600	41
Mawilganga-watte	217500	36
Erracht	209700	35
Great Valley	199700	42
Rondura	198070	36
Clunes	196000	36
Mt. Temple	195520	36
Penrhos	193500	40
Weeoya	191100	34
Mocha	187790	50
Shrubs Hill	185900	39
Dunkeld	185700	43
Monkswood	184000	51
Yataderia	182300	34
Clyde	179700	36
Pine Hill	178300	43
Templestove	176750	42
Ukuwella	176400	34
Ascot	175731	35
Warakamure	173300	33
Waratenna	173300	34
Castlereagh	170000	42
Roberry	168900	44
Ottery	168590	45
K. P. W.	167600	37
Neboda	167300	36
Torwood	166600	38
Glencorse	165000	38
Putupaula	161200	38
Hornsey	160000	42
Erlsmere	156600	40
Dammeria	156500	42
Woodend	156200	35
Poilkande	151300	34
Chesterford	151100	37
Nillomally	150900	43
Marigold	147700	44
Kelani	145100	37
Glendon	142400	38
Galoola	140400	43
St. Johns	14[illegible]300	57
Kanangama	138850	30
Doragala	136300	38
Talgaswella	136000	35
Kotuagedera	135770	35

Estate.	Quantity Sold. lb.	Average Price. c.
Kirklees	135100	40
New Valley	132400	43
Bellongalla	132000	34
Aberdeen	130600	37
Tymawr	128400	45
Geragama	128200	35
Gangawatte	127200	42
Yarrow	127000	38
Maskeliya	125800	43
Minna	124900	45
Deniyaya	123700	38
Gampaha	121700	44
Glengariffe	120400	41
Ellaoya	119900	38
Waitalawa	119500	40
Depedene	119300	35
Hangran Oya	118800	38
Bloomfield	118000	43
Ambragalla	117700	39
Queensland	116000	42
Ranasingapatna	115700	39
Matale	115500	37
Neuchatel	115100	36
Gonapatiya	113800	46
Ruanwella	113400	36
Harrow	112200	43
Agra Oya	111400	41
Morahela	111000	36
Ferndale	110600	41
Gallawatte	110400	38
Rookwood	109800	39
Killarney	109100	40
Edella	108900	35
Freds Ruhe	108000	34
Galella	107960	40
St. Heliers	105100	39
Kelaniya and Braemar	104500	42
Dea Ella	103500	37
Lameliere	103100	41
Naseby	102700	51
Deaculla	101400	43
Stamford Hill	99600	46
Hanagama	99300	34
Inverness	99100	43
Yapane	97900	41
Palmerston	97400	48
Kincora	97300	41
Mansfield	96100	46
Gangwarily	92100	34
Nabavilla	91800	46
Battewatte	91700	36
Kilkenny	91500	36
Kurulugalla	91100	34
Coreen	91062	44
Mahanilu	91000	42
Fairlawn	90400	44
Passara Group	90145	43
Hatherleigh	89500	34
Ferriby	89500	33
Ingeria	88900	35
Patiagama	87600	40
Annandale	87500	46
Lonach	87200	38
Errollwood	87000	44
Stisted	86600	38
Monrovia	86600	35

Estate.	Quantity Sold. lb.	Average Price. c.
Havilland	86500	34
Dunbar	86400	49
Nakiadeniya	86300	36
Mt. Everest	85000	49
Morankande	84000	36
Little Valley	83900	39
Dickapittia	83700	40
Siriniwasa	83000	35
Harrington	82900	47
Hatdowa	81700	34
Mousakelle	81600	38
Holton	80900	36
Mahatenne	80600	35
Galphele	80200	36
Gonapitiya	80000	46
Blink Bonnie	79800	45
Maldeniya	79500	35
Theydon Bois	79100	39
Vathalana	78900	37
Irex	78700	33
Murraythwaite	78650	36
Nyanza	78500	41
Matalawa	78500	32
Citrus	77900	35
Drayton	77400	43
Claremont	76680	37
Iona	76675	53
Digdola	76400	36
Theberton	76300	36
Agra Elbedde	75700	45
Carfax	75200	47
Ramboda	74000	39
Amblakande	73700	36
Ravenscraig	73400	36
Munukettia	73300	43
Nugawella	73100	37
Scenagolla	72900	45
Glenalla	72800	34
Columbia	72800	47
Carberry	72500	35
Ireby	71900	48
Oonoogaloya	71500	39
Mossend	70820	42
Roseneath	70500	37
Mount Vernon	69700	50
Salawe	69300	34
Orion	69000	34
Anningkande	68600	39
Ingroogalla	68200	37
Farnham	68000	37
Dambagastalawa	67900	42
Lyndhurst	67800	35
Rowley	65300	42
Galapittakande	65000	41
Cooroondoowatte	64800	41
Strathspay	64800	41
Grange Garden	64400	40
T'Villa	64066	34
Bargany	63500	43
Corfew	62900	39
Koslande	62500	38
Dikmukalana	62200	36
Narangoda	61900	35
Cleveland	61630	47
Scrubs	60500	44
Dalhousie	60200	43
Lower Dikoya	59900	37

Estate.	Quantity Sold. lb.	Average Price. c.
Dalukoya	59700	38
Perth	59400	38
Nugagalla	59100	38
Thedden	58700	38
Walpita	58100	38
Galkadua	58100	35
Forest Hill	58000	35
Macaldenia	57500	39
Hatton	57300	48
Mary Hill	57000	37
Ambalawa	56700	35
Honiton	56700	35
Mapitigama	54800	38
Carney	54700	34
Nillicollawatte	54300	36
Hapugasmulle	54100	34
Hopewell	54000	35
Bollagalla	53400	35
Dorankande	52400	36
Labugama	52000	35
Killin	51700	34
Gallustain	51600	35
Sirikandura	51300	35
Orpington	50400	36
Massena	50180	37
Bittacy	50000	45
Ravana	49800	37
Whyddon	49100	41
Natuwakelle	49000	35
Loughton	48900	35
Uda	48700	31
Hopton	48000	40
Dryburgh	48000	37
Ben Nevis	47920	46
Cotswold	47800	39
Walton	47566	37
Melrose	47400	38
Nahalma	47300	35
Pusella	47100	39
Gonavy	46500	40
Hiralouvah	46000	37
Walahandua	45900	37
Mousakande	45800	34
Tyspane	45500	40
Hentleys	45300	37
Oakham	44700	42
Coslanda	44500	41
Gampai	43750	35
Beau Sijour	43600	32
Elchico	43100	35
Halwatura	42200	36
Kandaloya	42000	37
Maligatenne	42000	29
Pansaltenne	41800	35
Ratwatte	41700	38
Romania	41670	32
Kitulgalla	41500	36
Woodthorpe	41400	37
Dartry	40800	28
St. Leonards on Sea	40700	34
Arncliff	40500	40
Tembeligalla	40500	37
Devonford	40400	64
Henegama	40270	30
St. Catherine	39500	35
Galkande	39400	33

* List published by the local "Times" re-arranged according to quantity sold.

Estate.	Quantity Sold.	Average Price.	Estate.	Quantity Sold.	Average Price.
	lb.	c.		lb.	c.
Longford	38400	36	Bickley	23600	34
Hunasgeria	37600	32	Agras Land	23590	33
Bogahagodawatte	37400	35	Meddegodde	23500	36
Stafford	37000	46	Doonhinda	23300	42
Wariatenne	36800	37	Callander	23300	43
Bidbury	36600	39	Illukettia	22900	33
New Peradeniya	36300	42	Osborne	22800	40
Blairgowrie	36500	26	Huanuco	22500	33
Amblangoda	36200	40	Florida	22500	32
Puspone	35700	40	Forres	22500	42
Beaumont	35400	37	Tyegrove	22400	40
Meddakande	35000	38	Monkton	22000	37
Warwick	34200	43	Horagola	21900	35
Vincit	34200	34	Yoxford	21800	35
Tiddydale	33900	33	Deniyayagama	21700	36
Wewatenne	33700	35	Abbotsleigh	21500	51
Mausa Eliya	33600	39	Dedugalla	21500	30
Maragalla	33600	38	Sinnadua	21210	36
Rockside	32600	31	Monte Christo	21200	39
Malvern	32600	43	Koladeniya	20900	31
Pindeni Oya	32500	33	Frogmore	20800	47
Maha Oya	31900	33	Glenorchy	20600	50
Bowhill	31600	38	Wewawatte	20200	35
Maddugeddre	31400	36	Kosgama	20000	34
O'bode	31200	40	Syston	19800	38
Rickarton	31100	47	Woodstock	18800	38
Welgampola	30900	33	[illegible]orowatotum	18800	36
Baverley	30500	39	Kosgahahena	18500	27
Parsloes	30400	39	Palwatte	18200	36
Chetnole	30200	36	Kekuna Hena	18100	39
Mipitakande	30200	29	Aberfoyle	18000	38
Kosgalla	29800	36	Eilandhu	17100	35
Tawalamtenne	29800	38	Yaha Ella	17000	35
Charlie Hill	29700	35	Rothes	17000	47
Sapitiyagodde	29500	36	Kirindi	17000	41
Akkara Totum	29200	31	Suriawatte	17000	34
Eladuwa	29000	33	Troup	17000	34
Wilpita	28900	32	Colva	16800	33
Evalgolla	28800	36	Carendon	16800	33
Castlemilk	28700	36	Raven Oya	16600	36
Blackburn	28600	35	Laurence	16500	40
Keengaha Ella	28540	35	Park Hill	16400	34
Ossington	27800	33	Kakriskanda	16300	36
North Matale	27600	41	Kotigalla	16200	29
Harrisland	27500	34	Meddetenne	16000	39
Gonavy	27300	37	Urugalla	16000	31
Stockholm	27300	43	New Angamana	16000	29
Gwernet	26800	37	Panapitiya	15800	32
Lauderdale	26800	33	Arslena	15800	36
Ewhurst	26500	35	Ettapoila	15700	35
St. Edwards	26100	37	Raxawa	15700	37
Kadienlena	25900	29	Shannon	15500	36
Sutton	25900	49	Primrose Hill	15500	35
Mandara Nuwara	25900	42	North Pundalu-Oya	15410	38
California	25700	31			
Orangefield	25700	32	Rozelle	15400	30
Polduwa	25600	31	Maryland	15400	34
Suduganga	25500	39	Auburn	15200	35
Choughleigh	25500	38	Ovoca A.I.	15100	31
Paradise	25400	34	Mahalla	15000	35
Gingranoya	25300	38	Glenalmond	15000	34
Bodawa	25000	36	Kolapatana	15000	40
Moragalla	24600	34	Hurstpierpoint	14900	30
Birnam	24500	34	Polpitiya	14800	34
Batalgalla	24400	37	Fairfield	14600	32
Razeen	24400	35	Oakham	14500	39
Yspa	24300	29	Halanagalla	14420	37
Silverkandy	23800	57	Nonpariel	14000	42
Weygalla	23700	36	Theresia	14000	38
Bokutua	23600	37	Florence	14000	37

Estate.	Quantity Sold.	Average Price.	Estate.	Quantity Sold.	Average Price.
	lb.	c.		lb.	c.
Goonambil	14000	34	Caledonia	8600	32
Kerenvilla	14000	32	Galpotagama	8600	32
Donside	13900	32	Nega	8500	33
Mutiyangoda	13900	30	Dehiowitta	8300	33
Udapolla	13900	36	Haputale	8270	35
Kalupahena	13700	32	St. Julia	8200	30
Woodlands	13600	39	Mount Clare	8100	37
New Galway	13600	50	Sadamulle	7600	33
Yatiyana	13500	35	Elemane	7500	36
Fetteresso	13200	52	Verelapatna	7400	47
Jack Tree Hill	13200	37	Tientsien	7090	27
Pathulpana	13100	32	Ritni	7010	39
Kuduoya	13000	41	Katabolla	7000	20
Yellatenne	13000	38	Carlin Valley	6700	34
Dotel Oya	12800	38	Venture	6400	35
Palmgarden	12700	33	Downside	6300	36
Marguerita	12600	43	Ardlaw	6200	36
Ahamud	12100	30	Meemora Oya	6200	31
Trewardena	11700	31	Akoowatte	6004	24
Horagaskelle	11700	34	Olahitagoda	6000	31
Mora Ella	11400	38	Comillah	6000	34
Chapelton	11200	28	Wallasmulle	5500	32
Shawlands	11100	35	Galatotta	5300	30
Udabage	11030	39	Raglan	5200	33
Handrokande	11000	35	Walleyfield	5100	27
Graceland	10800	33	Mahagoda	4300	30
Unugalla	10500	38	Glanrhos	4300	27
Ettie	9800	26	Mount Pleasant	4300	35
Hemmingford	9720	29	Ivies	3900	27
Bovey	9700	36	Peak shadow	3800	31
Forest Valley	9500	39	Allakolla	3500	25
Daphne	9500	33	Alutkelle	3100	31
Patirajah	9200	35	Sirisanda	2700	24
Derby	9000	34	Savernake	2700	22
Halloowelle	9000	36	Radella	2600	29
Kahatagalla	8900	34	Radage	2500	31
Nooranie	8900	27	Pussetenne	2000	24
Ardutbie	8800	35	Danawkande	1700	35
Manikwatte	8600	35	Glentaffe	1100	26
Ketadola	8600	33	Ratuville	1000	24

NO. OF ESTATES SELLING TEA IN COLOMBO:

Rate of Increase.

Year.	Estates.
1894	90
1895	141
1896	248
1897	349
1898	442
1899	487

Weed-Killer—Mr. White, a florist, of Worcester, was proceeded against on January 16 in the Qneen's Bench Division by the Pharmaceutical Society for selling a weed-killer containing arsenic, he not being a person permitted by law to distribnte poisons. It appeared that the florist did not keep the weed-killer in stock, but sent on any orders he might receive to the manufactnrers, who executed the order, and gave him a commission. The connty court judge of Worcestershire held that the defendant, White, was, within the meaning of the Act, not the seller of the weed-killer. This decision was appealed against by the Pharmaceutical Society but the court, without hearing counsel for the respondent, dismissed the appeal, and npheld the decision of the connty court judge. The Society will have to be more careful in operations.—*Gardenrs' Chronicle.*

COFFEE IN QUEENSLAND.

REPORT OF THE INSTRUCTION IN COFFEE CULTURE.

Sir,—I have the honour to submit my Report.

Having reported myself at your office on my arrival from India on the 10th of January of this year, I commenced my duties by leaving Brisbane on the 21st, and proceeding, under your orders, to Cook own, with the object of working my way southward through the coffee-growing districts as far as Mackay, and compiling a report on the industry.

It so happened, through force of circumstances that I shall give in detail later, that I was prevented from carrying out the programme originally intended, and, instead of being able to return to Brisbane in a position to draw up and submit to you a detailed report upon the industry in the whole colony, I only got as far as Cairns on my southward journey, and have remained here since.

At Cooktown I was enabled, by the courtesy of Mr. Jas. Dick, to go round the district somewhat, and to see what land there was under the cultivation of coffee, and also to judge of some of the soils and lands in their vicinity during the week I spent there. I mucn regretted that I could not then spare the time to see the Bloomfield district as well as the McIvor lands, which, from what information I could gather, and judging by the nature of the land, climate, and soil that I was able to see, would seem to be well suited to the culti ation of coffee—even more so than the vicinity of Cooktown.

Coming further south, I had to miss Port Douglas, including the Mossman and the Daintree districts, in both of which places coffee is being cultivated.

Judging by the letters I have received appealing for information and advice from these ports, it would seem that a visit there as soon as may be would be of advantage to the industry and benefit to the growers.

The rainy season coming on, it was desirable that I should push through with the larger centres, and visit the rest later on when time allowed.

I arrived in Cairns on the 4th of February, and from that date until my receipt of your telegram of the 8th March, requesting me for the time to confine my attention to other duties, I was assiduously visiting the coffee-growers and their estates, giving what information was required, demonstrating, to the best advantage in the short time I could spare to each, the necessary works that where due for execution at that time of the year, pointing out errors and omissions, explaining the theory and advantages of as well as the practical reasons for adopting the correct and more modern methods of cultivation, and making notes and collecting matter for the report to be submitted to yourself.

It will be seen, therefore, that my work in connection with coffee culture in this colony since I joined the Department has extended over a few days in January and but little more than the month of February—roughly speaking, for some forty days in all.

Being the only officer of the Department in the North, and on the spot when the last overseer of the Kamerunga State Nursery passed away, I was asked to take over charge pending the appointment of another overseer. Before this could be settled, the new regulations respecting the inspection of fruit and plants exported from this port came into force, and this complicated matters. The work of inspecting imported plants and fruit not being heavy, the appointment of inspector under "*The Diseases in Plants Act of* 1896" had until then been attached to that of overseer of the Nursery. The new regulation, requiring the examination of all bananas leaving this port for Victoria, made the work very much heavier; and there being no one else then available competent to carry out the examination for the minute signs of fruit fly in its initial stages, I was requested to do this work also. This necessitated my presence in Cairns on nearly every day in the week and on the wharf frequently until late at night. These matters have now been arranged, however, by the transfereuce of the sub-overseer of the Mackay Nursery for work on the Kamerunga Nursery, and by the appointment of an independent inspector for the port of Cairns under the Diseases in Plants Act. I hope, therefore, while still making this my headquarters and the centre of my operations, to be free after this for work in connection with the coffee industry, I trust also that my headquarters will be permitted to remain in the centre of the coffee-growing districts and the scene of my operations.

In the short time I have hitherto been able to devote to my industry I have visited the districts of Cooktown, and, in Cairns, of Hambledon, Kuranda, Myola, and Atherton. I have not been able to finish the districts of Cairns yet, there being many more estates and growers to visit, including among them the two largest growers in the colony—the Hon. De Molyns and Messrs. Cutten Brothers.

I have visited 43 separate coffee-growers, representing some 200 acres of coffee. Many of tbese have only small areas, but I would submit these are as important as the larger growers, for it is on the success of the smaller ventures that the larger estates are opened and the large and prosperous industries built up.

With regard to *statistics*, I regret that I cannot as yet give any, since I have been able to go over so little of the land under the cultivation of coffee. As I go round I hope to be able to compile statistics. Those given to me, on my asking for them, in the Department's offices in Brisbane, showed some 283½ acres for 42 growers. This included Cooktown, Cairns, Nelson, Cardwell, Port Douglas, Daintree, Mackay, Yeppoon, St. Lawrence, and the Buderim range. Whereas I have visited more growers representing in aggregate two-thirds of the area mentioned, in the districts of Cooktown and Cairns (in part only). I therefore am of the opinion that when I can give exact statistics both the extent of the industry and the number engaged in it will be larger than the Department aud the public are aware of.

With respect to *soils and climates*, I have seen only a small portion of the colony as yet, and it would be impossible for me to make any but the most general statements until I have been able to thoroughly go into the whole matter, and have seen and appreciated the conditions to be found in all parts. Bearing in mind this fact, I can still say that both the soils and the climates obtaining in this country are infinitely superior to those in which coffee is grown in many—and indeed most—of the coffee-growing centres of the world.

Labour.—This also is a question that needs careful consideration, and, having had to do with the matter of labour for coffee culture in other conntries, I feel the more diffident in making any statement until I have been enabled to take up the subject aud make myself thoroughly conversant with all its details. Without losing sight of this fact, I am of opinion, from what I have seen, that while undoubtedly a difficulty (of what magnitude I cannot yet say) it would seem to be much less than many are inclined to think and make it.

The cultivation of coffee has hitherto practically been carried on only in countries where labour is cheap; conseqnently it has obtained for itself a name as an industry that cannot be successfully worked without an nnlimited supply of cheap labour. Sufficient consideration has not been given either to the reduction of the amount of labour necessary for the work or to the choosing of soils and climate where the bearing capabilities will be so favourable as to counteract a comparatively more expensive labour supply. Those intending to invest capital in coffee cnltivation, having little or no practical experience of it themselves, rush to countries where labour is cheap, and there put up with conditions of climate and soil that are frequently exceedingly poor. In this country the conditions of climate are exceptionally favourable, and of soil such that very few coffee-growing countries can in any way compete with. I am therefore inclined to think that

economy of labour, by adopting modern and better methods of culture and thus reducing the cost of production; careful and scientific curing, allowing the produce to take its place as a high-grade article and bringing into competition its analytic qualities, which are high; together with the infinitely greater bearing capabilities that coffee here has over that of other countries, will enable Queensland coffees to compete favourably in the world's market, in spite of a disadvantage respecting labour.

The Market for Coffee.—There would seem to be a fear amongst some of the growers that owing to the recent drop in prices there will be no sale for coffee produced. In reply to this, and without going into details of imports and local sales, I would point out that the drop has been principally in the medium and low-grade article. Sir Frederick Able, in a letter that has already passed through your office, corroborates this when he says, speaking of the coffee market at the time of the arrival in England of the consignments of Queensland coffee sent last season: "Prices are depressed for all *except* the finest coffees."

So long as the coffee sent to the London market is a well cultivated and well-cured article, and therefore takes its place as a high-grade coffee, there is no doubt whatever about there being a ready market for it. Prices of low grades may possibly remain low, and even have a tendency to drop, but high grades will always sell well. Roughly speaking, about two-thirds of the world's output of coffee is low grade and only one-third high grade, and the low grades must make way for the finer coffees.

It has been remarked—and printed and published also—that the fault of Queensland coffees is in the *curing*, which means that while its analytic properties are high it is otherwise a poor sample. From what I have been enabled to see, this is undoubtedly so, but this is only half the truth. The root of the matter lies in the cultivation. A badly-cultivated sample will not, even with the best and most scientific curing, give the same profits that a well-cultivated sample will do, because in almost all cases it will have cost too much in production.

A coffee produced at 6½d. or 7d. per lb. and sold at 7d. or 7½d. does not pay to cultivate, or the profit is so small that the investment does not give even fair interest. When by good cultivation the cost of production is lowered to 4d. or 4½d., and the same article (putting better curing on one side for the time being is sold at 7d., or 7½d. the difference, amounting to £28 a ton, is readily appreciated.

By cultivation it must be understood that methods, times, and seasons are meant. The most excellent work—be it weeding, draining, pitting, digging, forking, staking, topping, pruning, handling, mulching, manuring, or even picking—if not done by good methods or at the right time and seasons, so as to save and economise labour as well as to give the greatest amount of benefit to the plant, amounts to bad cultivation, since it means enhanced cost of production.

For instance, a handling in the second year costing very little, would mean not only quicker and cheaper handling and a saving of labour in the third year—the two works together costing less than only the one operation in the third year—but enhanced stability and sturdiness of the tree, better and stronger wood, a direction of energy into the right channel and more, as well as a better sample of crop in the third and subsequent years.

The subject of statistics, soils, climatic conditions, markets (both local and open), values of present samples of coffee, methods of culture in vogue and modernised, the labour question as affecting the industry, the classes and varieties of coffee in the colony, &c., &c., I would request your permission to allow to stand over until I can make myself better acquainted with the conditions obtaining in the colony.

It will be evident to you that it would not be reasonable to go into details of such matters after only forty days' observation, and that statements respecting them should be applicable to the whole colony; whereas, with the limited time I have been able to devote to the colony, any remarks I were to record must necessarily either be evolved from hearsay or unconsciously biassed in favour of what I have been able to see. I would request that I be allowed to compile a full and detailed report either during the year or, should my other duties hinder an early drawing up of such a report, in time to be included in the departmental report for 1899-1900.

I would also suggest that it would be of advantage to the industry in general if I were to monthly submit an article on one of the many details of culture for the publication in the Departmental *Journal*, so arranged that they could be subsequently embodied in a pamphlet which could be issued as a bulletin for use of resident growers in a compact form. or for newcomers who intend opening out in coffee.

Since my work in connection with the industry has been, for the unavoidable and unforeseen reasons above mentioned, stopped temporarily, I have received many letters asking for advice and information, and also for visits to different parts. I have endeavoured to give what instruction I could by letter. an a good deal of my time has been so occupied. Giving instruction by letter, however, on very vague data, to be applicable to districts and conditions I have not seen, necessitates the mentioning of so many different methods necessary for as many possibly different conditions of climate, soil, &c., that a great deal of imapplicable matter has unavoidably to be recorded, and a great deal of time wasted.

I have already had correspondence with and also been interviewed by several newcomers, who, hearing of my arrival and appointment, wish to invest in and open up in coffee.

Information has been asked for from time to time by the Department both for different parts of the colony and for outside, and duly given, and an article published in the *Agricultural Journal*.

HOWARD NEWPORT.

TRIAL OF FLORIDA VELVET BEAN.—Mr. F A Hunter of Halfway Creek (country of Clarence), reports having tried a plot of velvet bean alongside a plot of cow-pea. The seeds were shown in November. "The growth of the velvet-bean is enormous, covering a row of corn that is close with one mass of vine, while the cow-peas are only just running." In reference to this matter Mr. Valder remarks that while the Florida velvet bean is undoubtedly of great value in the Northern districts, it could not compare with the cow-pea for districts as far south as the Hawkesbury, for instance.—*Queensland Journal.*

RIVAL TEA ENTERPRISE: CEYLON AND INDIA.—Whether the climate of Calcutta is inimical to any exertion over and above what is absolutely necessary for the actual carrying on of business, we cannot say, but one thing is certain, and that is that we are laggards in the race compared with our Ceylon brethren. Ceylon has been spending its money freely, and pushing its teas in all directions, with an amount of life and vigour which is bound to ensure success. We have done nothing like so much in comparison. We may some day have a rude awakening from our lethargic somnolence. Although we imagine we are slumbering in safe security and have no cause to fear any rivalry, we shall later on, probably, find Ceylon in fixed possession of markets which we should have captured long ago. When we read the reports of what the Ceylon planters are doing, and note how very energetically they are working to extend the consumption of their teas the world over, we cannot but help being struck with the want of energy and push we are displaying, in comparison, in our efforts to extend the consumption of our teas. The facts are so patent that further comment is superfluous.—*Indian Planters' Gazette,* March 17.

MICA-MINING IN BENGAL.*

DIFFERENT KINDS OF MICA, SIZE OF SHEETS AND VALUES.

By A. Mervyn Smith, M. Inst. M.M.

Position.—The mines described are situated between 85 deg. to 86 deg. 30 min. east longitude, and 24 deg. 25 min. to 25 deg. north latitude. The country is made up of a series of parallel ranges of low hills some 400 ft. above the surrounding country and 1,200 ft. above sea level. The direction of the ranges is east and west nearly; they form the boundary between the Hazaribagh district on the south, and the Gaya and Monghyr district on the north, being part of the Bengal Presidency, India.

Geology.—The country is made up of gneiss, grading into mica schists, tourmaline schists, hornblende rocks, quartzites, and a course felspathic rock resembling conglomerate with intrusive dykes of fine-grained diorite. The hornblende rock closely resembles the diorite, and weathers into similar rounded boulders. But this variety passes into a much coarser kind, in which "blebs" of white felspar are so close-placed as to give it a "banquet" appearance. The mica schists are strongly developed in this area, and are made up chiefly of white mica (muscovite) with here and there a little black mica (viotite) and red mica (lepidolite). This rock is highly schistose, breaking up into thin laminæ, and consists chiefly of small plates of mica, cemented together, with a slight admixture of felspar and quartz. It is this rock that contains the lodes that yield the mica of commerce. The gneiss and other foliated rocks have a nearly east and west strike (about 5 degrees north of east and south of west), and underlie to the north at an angle of about 75 degrees. These rocks are classed in Indian geology as among the younger gneisses.

Pegmatite Veins.—Running with the bedding of the schists, from east to west, are numorous veins of granite (pegmatite) varying in width from a mere thread to 20 ft. The schists are in places faulted or thrown out of their normal strike. Tho pegmatite veins are subjected to the same "faulting," and frequently at the point of "faulting" short north to south veins or "cross courses" of great width have been formed.

The veins are made up of amorphous masses of quartz, large crystals of pink felspar (orthoclase), and crystals or "books" of mica (muscovite). The quality of the vein varies with the nature of the adjacent rock. Near to the quartzites, the vein stuff is nearly pure quartz with little felspar and mica. Where the adjacent rock is highly felspathic, pink felspar crystals are the chief constituents of the lode; while we may look for a large predominance of mica, where the including rock is mica schist. This fact is of importance, as a knowledge of this peculiarity of segregation in the vein matter enables the miners to discriminate between the spots that will yield more or less mica.

In addition to these three chief constituents of the pegmatite veins, the following accessory minerals are sometimes found—tourmaline, garnet tin-stone and a columbite. The tourmaline is at times strongly developed. Near to the tourmaline schists, large massive crystals of black tourmaline are not infrequent in the lode, and occasionally crystals of tourmaline penetrate the mica books across the planes or lamination and destroy the value of the sheets.

The pegmatite viens in this district are apparently of aqueous origin and due to segregation. The following are some of the data pointing to this conclusion. 1. In many places the veins die out in depth and in length. 2. The vein matter partakes of the quality of the including rock, quartz, felspar, and mica predominating as the lode traverses rocks containing these minerals in excess. 3. The crystallisation of the vein matter varying within very short distances not being at all homogeneous, as one would expect in an igneous dyke. In places the crystals of mica are 2 ft. long, 18 in. wide, and 9 in. thick. Within a few hundred feet of either side of this spot the mica books are small and worthless.

Ages of the Mines.—Tho zone of mica-bearing rock has been worked for centuries by the Hindoos. Mica is largely used by them for ornamental purposes, such as inlaid work, tassels, flower, toys, and banners. The large clear plates are much used by native artists for portrait painting, as being extremely durable and not affected by heat or damp and impervious to the attaks of insects. The waste mica is ground to a coarse powder, and after being mixed with starch is applied to cheap cotton cloths to give them a sheen.

The great marts for mica for native consumption are Patna and Delhi. Dr. P. Breton, who visited these mines in 1826, found as many as 5,000 people at work at different mines. In 1849 Dr. McClelland gives the output as 100,000 maunds (a maund being 82lb.). In 1863 the statistical account of Bengal says 10,000 maunds were exported.

The Native Methods of Mining.—The native mines are of the most primitive kind. Open cuts along the outcrops of the pegmatite veins where books of mica are seen in any quantity. These cuts are continued down 20 ft. or 30 ft. till the sides become dangerous. No timbering is used to keep the sides from falling in, and frequently accidents happen and the miners are buried beneath the fallen walls of the reef. Where exceptionally rich stuff is met, and the vein-stuff is decomposed and soft to some 50 ft. or 100 ft. inclines are put in, and follow down the rich shoots of mica in a most tortuous course, zig-zaging about from side to side with the "leads" of rich ground. Long lines of women, near to each other and placed in double row from the warter level to surface, hand ont earthern pitchers—called "gurrahs"—to one another; the full pitchers are handed up one line and the empties down the other. As many as seventy women are sometimes placed to remove the warter from a mine not 35 ft. deep in perpendicular depth. The incline, of course, was much more than this in length.

Where the reef is highly felspathic and of large size, decomposition extends to a quite hundred feet or more, and it is here that their largest mining operations are carried on. In order to ventilate the inclines and draw out the mica, perpendicular shafts, about 2ft. in diameter, are put in. The author counted as many as thirty of these circular shafts along the strike of the reef, and within a few feet of each other.

The miners are a local tribe called "Bandathis"; the men, women and children all working at the mine, when they have no agricultural work in the fields. Work is only conducted in the dry months (November to May). Immediately the rains set in they return to the tillage of their fields. Work is only condutcted in the day, beginning about 8 a.m., and giving over at dusk. When the veins are hard, yet sufficiently rich to pay for the labour, large fires are kindled aginst the face of the lode, and when the vein stuff is sufficiently heated, water is thrown on to it, when the sudden cooling causes the rock to shrink and crack. In these cracks wedges of soft iron, locally manufactured from the magnetite iron ores common in this neighbourhood, are driven and large boulders detached. The exposed books of mica are chiselled out and taken to surface. The books of mica are split into sheets of about ½ in. in thickness. All the rough edges and flaws are trimmed of by means of a sharp sickle (called "hasawah"), and then sorted according to colour and size. The sheets are in some cases very large, 24 in. by 18 in. being the largest in this district. In the Itakuri Mine, Nellore district, Machas, plates 60 in. by 40 in, have been obtained.

Present Method of Work.—It is only within very recent years that Europeans have taken to the mica industry. Mining is still conducted on purely native methods described above; and although 250 mines are at work in this district, on not a single one is machinery of any kind used, and certainly on none of the properties visited by me this year (1898) was there the least attempt at European methods of mining. The same wasteful, slow, and laborious system practised by the natives for hundreds of years

* Paper read before the Institution of Mining and Metallurgy.

is still in vogue. Men are sent out during the rains to search for likely-looking outcrops of mica. The mica-schist being softer than the other members of this series of rocks, is eroded into valleys—the more quartoze beds making the ridges of hills. A certain amount of alluvium and talus from the adjacent hills covers the valleys.

After exceptionally heavy rain this surface deposit is washed off, and with it the decomposed felspar of the pegmatite veins, having exposed tufts of partially decomposed mica. The natives call these tufts "foo-foo" and believe that they grow during the rains, as they cannot account for their exposure at surface after a heavy shower, where there was nothing apparent before the rain. Having discovered several of these "foo-foo" spots, these are marked off for mining operations as soon as the dry season begins. Parties of men, women, and children are set to work on those outcrops, and the books of mica dug out, packed in loads of about 30 lb., and brought in at dusk to the central store.

Here several skilled men are seated on the floor trimming the mica before it is packed away for market. Before each man is a stout peg, driven firmly into the ground and protruding about 18 in. The books of mica are first split into plates about 1 in. in thickness, the mica easily splitting into laminæ of any thickness. The trimmers are provided with sharp sickles, and the point of this knife is used for opening the sheets. Imperfect laminæ are now peeled off the plates till both surfaces show a clean, even face. The plate is supported against the side of the peg, and the sickle drawn downwards to trim off the jagged ends and irregularities along the edge of the sheets of mica.

After trimming, the plates are sorted for the European market, the United Kingdom and America being the chief buyers. The sheets are first sorted according to quality, four kinds being recognised by the dealers.

1. Ruby mica, hard and tough.
2. White transparent mica.
3. Discoloured and smoked.
4. Black mica and flawed.

If 8 represents the value of ruby mica, 4 would be paid for white, 2 for discoloured, and 1 for black and flawed sheets of equal size. The sizing is as follows:

Special Sheets Measuring more than 50 Square inches.

No. 1,	Sheets of from	36	to 50	square inches.
,, 2.	,,	24	36	,,
,, 3.	,,	16	24	,,
,, 4.	,,	10	16	,,
,, 5.	,,	6	10	,,
,, 6.	,,	4	6	,,

Quoting from a recent sale sheet at an auction in London, the following prices were realised:

Best Ruby. Number.	Per Pound. s.	d.
1	6	8
2	4	0
3	2	0
4	1	0
5	0	4
6	0	2

Specials bring as much as £1 per lb, according to size of sheets.

The sheets are trimmed irregulary into any shape they will take to clear them of flaws. Should square rectangular, or diamond-shape sheets be wanted, a special rate has to be paid for these to allow for the great waste.

The sheets are packed in boxes of 1 cwt., and transported on carts to the nearest railway station, 100 miles distant. From thence they go to Calcutta, and are shipped to London or the United States of America.

Market and Output.—During the year 1895-6, 8,913 cwt. of mica were exported from India, of which the mines under review contributed 8,835 cwt., valued at R995,000 or £66,000. The yield of the mines may be placed at double this figure, one-half being require for the Indian market, and that chiefly of the inferior kinds.

The export trade is a growing one, as the following figures will show:—

Exports.

	1892.	1893.	1894.	1895.	1896.
	cwt.	cwt.	cwt.	cwt.	cwt.
Bengal..	2,298	3,310	4.843	5,126	8,835

Hard, sound, ruby mica is much used for the doors of glass and steel furnaces where extreme heat is required. The mica is not affected by the extreme heat, and thus enables the workmen to look into the furnace and watch the crucibles of molten matter. Thin sheets are made into chimneys for incandescent gas burners, also for fire screens and for electrial purposes, as mica is an extremely bad conductor of electricity.

A method of cementing sheets of mica into a card board has been recently patented in Germany, and this cardboard is used for coating boilers, mica being a nonconductor of heat. It is also manufactured into helmets for fire-brigade men, packing for fireproof rooms, etc. Thinner sheets are made into envelopes for wrapping valuable documents.

Quantity of Mica Available.—At present India yields the bulk of the mica consumed in the Arts, and of this quantity nearly all comes from the district described. The pegmatite veins in this locality are numerous and of large size, and are in places extremely rich in mica, nearly one-third of the vein-stuff being of this material. The quantity of mica available is practically inexhaustible. The present method of mining is wasteful in the extreme and fully nine-tenths of the mica extracted from the mines is injured and rendered unfit for export. Thousands of tons of waste mica are to be seen at the mouths of the mines and at the dressing floors. Probably the new patented method of cementing mica into cardboard may create a market for this. There cannot be the slightest doubt that when European methods of mining are introduced, the cost of production will be materially reduced, the waste will be much less, and a better quality of mica will be secured. At present only the decomposed, or partially decomposed, vein-stuff is mined. Here the mica must also undergo a partial decomposition, but, of course, not to anything like the extent of the felspar. In the hard vein-stuff the mica is hard and tough, and this class of mica commands a better rice.

Some of the veins yield black mica (biotite). This is largely used as a drug by Hindoos and Mohammedans. Reduced to a powder, it is supposed to be very efficacious in cases of dysentery. The sheets of mica are at times very queerly marked. In places one-half of each sheet will be muscovite and the other half biotite, the line of division between the two colours being a perfectly straight line, and there being no apparent change beyond the colour in the uniformity of the sheet. Other sheets, again, are marked with a chequered pattern in black lines, the lines being due to magnetite. Again, there are dendritic inclusions of white quartz between the laminæ. All markings take from the value of the sheets. The most esteemed colours are pure ruby, amber, light green transparent white. There is also a silver white, which the natives prize for inlaid work.

A demand for indian mica has lately sprung up in the United States of America. In 1895 the quantity taken was, 1,900 cwt., while in 1896 it was 5,076 cwt. Indian ruby is found to answer the purposes of furnace work better than the locally obtained mica.

[Altogether, the export from India in 1897-98 was 11,608 cwt. and from Ceylon in 1897 it was 166 cwt. —ED. *T.A.*]

RICHES.—It was a saying of Plato, that the only certain way to be truly rich is not to have more property, but fewer desires. For whoever is always grasping at more avows that he is still in want, and must be poor in the midst of affluence. Here is a philosophy which many of us can contemplate complacently.—*Journal of the Jamaica Agricultural Society.*

ORANGES: HOW I MANAGE TO HAVE RIPE ONES.

The following communication was sent to the Director of Public Gardens, who kindly forwarded it to us as likely to be of interest:—"All through the year this is the way I did it. I had an orange tree in my kitchen garden last year in full bearing, and when tbe fruits were about the size of a pigeon's egg I went to work and took off all leaving 30, I then dug a trench 18 inches deep around the tree just under the outer leaves where the rain falls and had the trench filled with pen manure, and then covered up, thus forming a ridge about a foot high around the tree, and shortly after the tree began to blossom on one side only, and put out 38 oranges on one branch. Shortly after I saw more blossoms appear on the next branch to the young fruits, and 21 more came out. Since then the tree has been constantly blossoming and fruiting out young oranges, one course after another right around the tree, I was however careless in noting what month it was last year when I started the work, all I know is, the first 30 oranges were ripe in December the 38 were ripe at the end of March, and the 21 I am eating now; and I am able to show any man to-day four different sizes of fruit, and blossoms on the tree also. I don't know if this is an exceptional case, being the first tree I have tried, but I think its worth mentioning and also worth trying.—E.A.K, Little London, P.O."—*Journal of the Jamaica Agricultural Society*.

WATTLE CULTIVATION.

A NEGLECTED QUEENSLAND INDUSTRY.

There are many portions of the mountainous parts of Queensland of which it is often remarked that the land is apparently fit for nothing—that it will not feed the proverbial goat; that the undergrowth of young gums and wattles will not even allow a dog's bark to travel. From a purely agricultural point of view, such country is undoubtedly useless as farming land; but there are few "bad lands" in the colony, provided they do not consist of sandy, swampy "wallum" country, on which something of value will not grow. Take the gravelly ridges so frequently met with on the coast. They are unsuitable for maize, which will ptoduce on good lands from £6 to £8 per acre, but they are the ideal home of the Sisal hemp, and of tbe mauritius hemp, which will produce £40 per acre. In like manner, the ridges and gullies of the Main Range are a favourite habitat of the wattle tree, which will yield from £25 to £30 per acre. During the winter season, the eye of the traveller amongst the ranges is delighted with the beautiful, feathery, yellow bloom of countless wattle-trees of different varieties.

Three varieties have been planted for the purpose of obtaining tan bark, but these only two are of commercial value. The third was an unfortunate introduction, and in New Zealand formed a large part of the earlier-laid-out plantations. It is comparatively worthless. This is the *Acacia dealbata*.

The second best is the Golden Wattle (*Acacia pycnantha*), the bark of which yields a large per cent. of tannin. But this does not form a large-sized tree, and from its habit of growth, throwing out many stems, more like an immense bush than a tree, it is more troublesome, and consequently more expensive to strip than the Black Wattle (*Acacia decurrens*), which grows to a respectable size and forms a good straight barrel. Wattle-bark is extensively exported from Tasmania and New Zealand. The price has fallen to £5 15s. per ton, whilst formerly the bark in bundles fetched £12 per ton. But it will pay at the lower price, once a plantation is established. It takes about nine years before a full return can be obtained

The wattle, whilst doing well on poor soils, has no objection to a richer one, provided it be well drained. Hence on the naturally drained slopes and valleys of the ranges, plantations may be formed with almost a certainty of success. Bush fires will naturally do much damage, but the effects of these may be minimised by judiciously planting—leaving breaks between the blocks.

Inspector Clifton, of Auckland, New Zealand, describes the wattle plantations at Wairangi. He says the usual procedure in forming a wattle plantation is to fell and clear the scrub, plough, and work down roughly with disc harrows, and sow during the month of October.* Scald the seed, and sow at the rate of 1 lb. per acre. A great advance on this is to drill in ¾-lb. of seed with 1 cwt. of bonedust. Trees so treated are, at two years, equal to those of four years' growth sown without manure.

The cost of wattle-planting may be estimated as follows:—

	£	s.	d.
Clearing and burning, per acre...	0	7	6
Ploughing	0	7	6
Dics harrowing, one stroke ..	0	1	3
Sowing	0	0	9
Seed, 1 lb.	0	2	0
Harrowing	0	1	0
Total ..	£1	0	0

To this, with advantage, may be added—

	s.	d.
Second ploughing, at 6s. per acre.. ..	6	0
Bones, 1½ cwt., at £5 10s. per ton.. ...	8	3
Total.. ..	14	3

The returns may be estimated at—

	£. s. d.	£. s. d.
Per acre—10 tons of green bark= 5 tons dry, at £5 15s. per ton..		28 15 0
Expenses—		
Shipping 10 tons, at £1 per ton	10 0 0	
Weighing, carting, and strong 10 tons at 2s. 6d.	1 5 0	
Railage, about 5s. on 5 tons ..	1 5 0	
		12 10 0
		£16 5 0

From this has to be deducted rent, interest, &c.

Wattle-growing in New Zealand for the production of tannin bark occupies an area of about 4,500 acres in the Auckland district. The black Wattle (*Acacia decurrens*) is the only variety planted.

Wattle plantations do not increase greatly, mainly owing to the length of time which elapses before a full return can be obtained. There are, however, many settlers in Queensland, who have from 5 to 500 acres of poor open land, where scarcely any clearing is needed, and on which they might in spare moments put in a few hundred trees which would come in to benefit some members, of the family. We know of farmers who have occupied their land now for nearly forty years, and the portion of hungry, waste, untouched land lies hungry and waste to this day. Had this been planted ever so roughly with wattle-trees of the right kind, they would have been enjoying an income of at least £10 per acre for thirty years, and at the old prices that income would have reached £30 per acre.

At Lucindale (S.A.), Mr. Newman recently read a paper on Wattle Cultivation before that branch of the Bureau of Agriculture. He said had great confidence that this could be made one of the most profitable industries of this district, as the soil, climate, and the facilities for delivering the bark at a seaport are all that can be desired. He saw part of a plantation east of Adelaide stripped; the yield being 4 tons per acre, and enough small wattles being left to make another good yield in two or three year's time. The price obtained for the bark

* The scrub here alluded to is not the dense vine scrub with which we are familiar in Queensland, ED. *Q.A.J.*

was £5 4s. per ton in the field; the price paid for stripping was £1 5s. per ton, which included cutting the trees down and packing them in heaps; the landowner receiving £4 per ton clear, equal to £16 per acre. The land was of poor quality, being very stony and sandy. During the past ten years he had experimented in wattle growing in this district, and proved that they can be grown on almost any land that is over 3 feet above the level of the winter flood waters. A few months ago he stripped a wattle seven years old that gave over 1 cwt. of bark fit for market. Trees of that size standing 20 feet apart each way would give over 5 tons per acre. That trees was grown on a limestone ridge (red soil), and he had them of nearly equal growth on the fern hills (white sand). As there are thousands of acres of open fern land in that district almost useless for grazing, and eminently suited for wattle-growing, he would strongly urge leaseholders to give that industry a trial. Such land is leased at from ½d. to 2d. an acre annually. About four years ago he planted 1 acre of fern land, and now estimates the wattles on it to be worth £8 to 10. Although the wattle has never been systematically cultivated at Mount Benson, in the Kingston district, still it grows there over a considerable area, and last season no less than 1,200 tons of bark were stripped and send to market, the price received ranging from £3 15s. to £4 per ton; and as stripping costs £1 per ton, it means £1,200 being distributed amongst the labouring classes of the district, and about £3,500 amongst the landholders and teamsters. The bark grown at Mount Benson is deficient in tannic acid, consequently a lower price has to be taken. Where only a small area is to be planted, he found the following a good plan:—Commence at one side of the field, using a double-furrow plough, strike out the length of the piece to be planted, then mark out back again paralled with the first furrows and about 8 feet away from them, and so on through the field. Then take 1 lb. of good seed for each acre, place in a vessel and cover with boiling water, and allow them to soak for twenty-four hours, then drop them regularly along the ploughed stripes and cover with a harrow. The next year it will be necessary to thin out the plants in the rows to the required distance. Where large areas are to be cultivated it would save time and labour to have a box fitted to the back of the plough with a roller through it, and worked by a belt which the near wheel, and so made to drop a seed or two at each revolution, and a small harrow attached would complete the planting in one operation. One team should do 8 acres a day. About every 5 chains it is advisable to leave a strip 16 feet wide unplanted for the purpose of drawing furrows in summer to check a possible fire, and later on as a roadway for carting out the bark. He could not recommend broadcast sowing, as there is so much more labour in ploughing all tho land, and the work of thinning out the young plants is very much greater. He would strongly advise that only seed of the true broad-leaf wattle should be planted, as it is doubtful whether it will pay to grow any other variety, the bark of which will be worth quite 20 per cent. less. Horses may be allowed the free run of a wattle paddock, but cattle should be kept out altogether, and sheep should not be allow in until the tops of the plants are out of reach, as they are very fond of the young shoots. He felt certain that if the bark had no market value it would pay well to plough fern hills, and sow 3 or 4 lb. of seed per acre broadcast, and keep all stock out for three years, by which time the wattles would provide a very large amount of feed for either cattle or sheep.

DOBBIE'S WATTLE-BARKING MACHINE.

This lately invented machine readily stripes the trees close up to the leaves far higher than could be stripped by hand. The speedy operation of the machine shows to special advantage on wattles from the thickness of walking-sticks up to 3 inches in diameter, indicating that where the crops of wattles were so abundant as to require thinning out, and were too small to strip by hand, it would pay to use the machine. It has been regarded as being quite evident that the machine would reduce the cost of stripping by at least 25 per cent. Moreover, by using the implement, stripping could be commenced much earlier and carried on much later in the season than is possible by hand. The machine itself has the appearance of a substantial roller mangle, the rollers being either metal or covered with metal. One man can carry out the whole of the operations; but it would apparently be still greater economy for two or even four men or boys to operate in conjuction with one another. In using the machine the wattles pass between the revolving rollers, thus receiving pressure upon two sides, which cuts top and bottom, and causes the bark to spring from the complete circle of the stem in two halves. It would appear from this that a very valuable addition has been made to the wattle-bark industry.—*Queensland Agricultural Journal.*

INDIARUBBER CULTIVATION.

BY SCIENTIFIC AGRICULTURE.

Malaya is the peculiar home and habitat of the guttapercha tree, but of late the cultivation of the Indian rubber tree has been recommended, and in parts even taken up by our planters. We need not go into the chemistry of the composition of the two substances, gutta and caoutchouc, but we may observe that the former tree is of slow growth and cannot be tapped in the way as rubber trees, owing to their having closed sacs, and not communicating tubes, containing the latex, and hence have to be almost destroyed or cut down to get at the commercial sap. Their natural order in Botany, too, is different from those trees which yield caoutchouc. Caoutchouc, or the true India rubber, is found in a number of orders, as the Moraceæ, Apocynaceæ, and Euphorbiaceæ. Some of these grow into magnificent trees, and others are mere climbers and vines. All these have the latex-holding tubes in the inner bark, some communicating with one another more freely than others and some yielding more than others. Of those, however, which have hitherto mostly entered into commerce, or which have hitherto yielded the most caoutchouc, only four varieties may be noted: the *Castilloa*, or panama rubber, the para rubber or *Hevea brasiliensis*, the ceara rubber or *Manihot glaziovie*, and the Assam rubber or *Ficus elastica*. Of these four, the two last may be neglected by us, as the ceara rubber tree does not seem to thrive in Ceylon, nor produce much, and the other, or Assam rubber, though it thrives, gives only a small yield. At the same time, it ought to be mentioned for both that a machine lately invented by Mr. Biffen, of Cambridge University, so does away with the labour and processes needful to separate and consolidate the rubber from the latex as to obviate the defect of small yield to a considerable degree; and it ought to be mentioned, for Assam rubber, that it is—possibly only in shallow soils—a great surface feeder, with great roots running in all directions for great distances half aboveground, and that all these roots, like some African varieties, yield the rubber. And for this reason, as well as that the tree thrives here, and we believe has already been begun to be cultivated, we may append two notes regarding it that may prove useful for planters. The first is that in congenial leaf-mould, shaded forest-soil in which there is a superabundance of moisture, any branch or twig simply cut down and thrown about will take root. The other is that the seeds, which should be fresh, should be sown in sheltered boxes or pots during the wet weather, the soil being composed of one part of half-and-quarter-inch brick pieces, one part of half-inch charcoal, and one part leaf-mould with a little dry cow-dung well ground; this last for top-dressing. The watering should be carefully managed, otherwise the seed and seedlings are rooted out and washed

away. Hence the necessity of keeping them under shelter from heavy rains. The boxes and pots should receive some light, and should never be allowed to get quite dry. From those nurseries the plants should be potted out singly when sufficiently high. There remain, thus, only two varieties, the *Castilloa* or Panama rubber and the *Hevea Braziliensis* or para rubber; to which we may confine our remarks. And here it may be observed that only till within three or four months back the latter, or para rubber was supposed, from its furnishing quantity for quantity, more and purer caoutchouc, to be the best to plant; whereas now, owing to Mr. Biffen's invention and the very much larger yield of latex—ten times as much in Ceylon—as well as fever and more simple incisions being necessary—thus immensely reducing cost and labour—the former, or *Castilloa* (Panama rubber) has come to be more thoroughly recommended for planters. Hence it is we see that most of our planters who directed their attention to this rubber cultivation have gone in for the para rubber. These will now see that it is the *Castilloa* or panama rubber which should be cultivated by them. In fact, in regard to this cultivation, which tree, which mode —as annual crops of seedling plants and twigs or as trees—and with machine and other inventions revolutionising past ideas, all are in such an unfixed, at the same time, progressive state that one object of this paper is to set this fact before our planters not only to enable them to be on the *qui vive*, but for them to adopt due caution and act calmly and not hastily. Of late years, there has been a great increase in the demand for rubber, prices have gone up and the subject has gathered round it quite literature of its own. Indeed, there is even a journal devoted to it, call the *India Rubber World*. Chemistry and mechanical invention, too, here, as in other similar products, have come in to aid in the manufacure, as we may term it, of the caoutchouc from the sap or latex, cheapening the production of the article, and taking up varieties of plants that were unprofitable before, or otherwise aiding in its production from twigs, &c. Indeed, it may or may not be known that Singapore itself at the present moment has a manufactory for expressing the juice or latex from leaves and twigs, which whether it be caoutchouc, or "viscin," to be further dealt with by chemists in Europe— is exported to Germany. And if to be further dealt with by German chemists—or whether it be not "viscin" but the true latex—there is here, in our very midst perhaps, the actual solving of the most difficult and most nearly interesting point that remains yet unsolved in Ceylon. In any case we may proceed with our general preliminary observations. As we have said above, things must be proceeded with cautiously. As yet, the India rubber can only be recommended as a minor or by-product of a plantation. The chemical quest that is proceeding may usher in a new era of extracting the rubber from annual crops instead of having to wait eight to ten years for a tree to be sufficiently grown to be tapped. Experiments are now being carried on in London and Trinidad to secure rubber from year-old plants of tho *Castilloa clastica*. (We may note here that this is not the same as *Castilloa markhamiana* which seems to be the kind in Ceylon.) To quote from an article in the *India Rubber World*: —"It has been found that seeds sown broadcast over a prepared field will yield an abundant crop of young trees, which, at about a year old, can be cut and sent to a factory where, with ordinary machinery, eight per cent. of fine rubber can be extracted from the young shoots. .....This young tree crop, at present prices, would return an estimated profit of $200 to $400 per acre." This extraction of the rubber from young shoots has been done in the chemical laboratory, and it only remains to apply to the chemical production of rubber on a large scale. Besides the *Castilloa elastica* there are also a number of other varieties that may be named as yielding latex from leaves and twigs, such as the *Alstonia macrophylla*, which grows in Ceylon, and the *Alstonia plumosa* of Fiji.

It has to be observed, too, that the rubber trees vary in their produce, just as most other plants, with change of habitat. These things will have to be observed and noted with respect to the Peninsula, and hence as well as for a variety of other strong reasons, it is to be regretted there is no proper Agricultural Department or Royal Experimental Gardens in a select locality, in the Federated States. Altogether, therefore, we may be sure that the cultivation of the rubber tree will enter on new phases in the near future. Root-tapping of some varieties may be more largely utilised; there may be annual young crops, the preparation of rubber from leaves and twigs, and the utilisation of a number of at present neglected plants by chemistry—all these are not only possible but probable. It may also be observed that in the matter of rubber, too, as in that of coffee, Brazil may be said to be the principal determining factor. The annual output of rubber all over the world, and which is all consumed, is put down at over 100,000,000 lb., and of this nearly half comes from Brazil, while most part of the rest also comes from Central America. Lagos, in Africa, has also lately taken a lead in the supply, while the great interior forests of the Dark continent, which have not yet been brought into the market, are also known to contain rubber trees of varieties.—*British North Borneo Herald.*

COFFEE HYBRIDS.

The *Revue de Cultures Coloniales*, in its last issue to hand, publishes an interesting note on "The Sterility of Coffee Hybrids" from the proceedings of the Agricultural Society of Kediri (Java) with an annotation by M. Maximo Cornu.

M. H. van Lennep, President of the Society, premising that it was desirable to discover whether by hybridisation it was not possible to obtain a race of coffee plants producing good fruit of superior quality, resisting *hemileia*, prolific and easy of multiplication by grafting is reported to have said. "How often, in looking at a superb hybrid coffee plant, have you not noticed, with regret, that a great part of the berries are empty and what few beans remain are altered and, by the fact, of inferior quality? It follows that hybrids afflicted as they are with these two faults, form a disadvantageous and little remunerative cultivation.

The bad quality of coffee gathered from these hybrids is above all attributable to insufficient fecundation. It is the more annoying as in general hybrids are distinguished by vigorous vegetation, a fine appearance, superb foliage on which *hemileia* does not seem to take hold, and a regular flowering, after which the plant fruits abundantly.

"It is thus with all the hybrids known, so far as I know," continues M. van Lennep, "and for this reason none have yet taken a serious place in cultivation. The problem has become urgent since the extension of vermicular disease (*maladie vermiculaire*) rendered impossible the replacement of individual Java plants dead of that disease by plants of the same species. The roots of the Liberian plant and certain hybrids alone resist *nematode* (vermicular disease).

Liberian coffee not being of easy sale, the idea arose of grafting Java coffee on the roots of Liberian, but the problem is not yet solved in that manner. "In practice," says M. van Lennep, "the operation of grafting is easy enough, the joining easily effected, the coffee is of good quality, but at low elevations at least, the development of the young trees does not seem vigorous enough, the grafted plant becomes feeble, and subject to *hemileia*; and taking everything into consideration, I hesitate yet to believe in the future of Java coffee grafted on Liberian roots. In elevated altitudes I cannot speak from experience.

How different is the aspect of hybrids grafted on Liberia! From the beginning, the development is so

vigorous that sometimes the graft appears more vigorous than the stem; there is every indication of great vital force, *hemileia* does not appear at all, the joining is perfect.

But, as I have said above, the hybrids which I have seen show a large proportion of empty berries or of beans imperfect and spoilt. I possess different hybrids; there are some which produce, so to speak, not a single healthy bean. Most of my plants, flourish vigorously, their foliage is fine, every year they are surcharged with fruit; without exception they furnish berries with soft pulp, equally easy to depulp with Java coffee. For some years it was believed that the hybrid "Klein Getas" (van Riemsdijk) constituted a happy exception and produced at the sametime beans abundant and healthy. I recognise willingly that the berry of that hybrid is a little more valuable than of the others which I know, and that the development of the plant is perfect. Nevertheless, it is not free from the great general fault, it gives too many sterile berries, "loos boon," and too many imperfect beans, nearly without selling value.

However, since variations are observed between hybrids, that is to say, that some furnish fewer abortive beans than others, I think it is justifiable to hope that the hybrid is susceptible of improvement. Further, that it is not impossible to obtain some day a hybrid that reunites the desired qualities —a well constituted bean and a vigorous growth.

There would bo nothing for it, therefore, than to continue to propagate by means of grafts upon Liberia."

In the rest of his discourse M. van Lennep insisted upon the point, that in order to increase the chances of attaining the desired end, it would be necessary not to abandon hybridisation to the chances of nature, but to undertake, on the contrary, methodical experiments in attificial hybridisation. M. van Lennep had projected the creation of an establishment specially directed to that research, but the necessary official sanction was not obtained.

M. Maxime Cornu, the emineut *Professeur du Museum*, has kindly communicated to us, says the *Revue des Cultures Coloniales*, the following observations *apropos* of the preceding note :—

"Botanists have long recognised the general sterility of hybrid plants; they have also considered that sterility was a fundamental character of hybridity; but the experiments of certain scientific men, and above all the repeated operations of horticulturalists (who work without troubling themselves with theories) have shown that that proposition is too absolute.

"The illustrious Darwin was remarked that fertility among hybrids is a charcter which is acquried in successive generations obtained by the force of successive sowings.

"That method is a lengthy one, but continued with science and sagacity, it may give important results. It should, however, be assured, in the first place, that the hybrid taken in hand really merits so much persevering attention, that it possesses beans of sufficient quality as well as a complete resistance to *hemileia*,

"Hybrids are far from necessarily possessing similarity between themselves; they may differ enormously one from the other and present altogether distinct individualities. They possess, in divers degrees, the characters of the parents; but these characters are sometimes mingled, sometimes juxtaposed. One may then hope, one day to obtain a form of hybrid which possesses the qualities of the two parents, for example, the robustness of *Coffea liberia* with the fine flavour of the *Arabica*. We should not be discouraged therefore.

"In order to assure ourselves, hybrids should be observed in large numbers in a systematic manner, and studied individually. It is necessary to make reiterated experiments."

M. Cornu considers these experiments should be taken in hand by Government, as private persons have neither the leisure nor the facilities for such lengthy and uncertain operations.—*Planting Opinion.*

HOUSEHOLD HINTS.

SWEET Potatoes make fine potato-chips if used just as common potatoes are. To fry them after they are cooked, cut in slices, dip in eggs and bread crumbs and fry as oysters. To make croquettes of sweet potatoes, take three teacupfuls of mealy baked potatoes, a table-spoonful of butter, a teaspoonful of lemon juice, the yolk of one egg, a gill of milk and salt and pepper to taste. Work all together thoroughly with a fork, then form into round cakes, dip in egg and crumbs and fry in smoking fat. If sweet potatoes are boiled for dinner, boil half a dozen more than will be needed and then prepare them with a hot dish for tea, in the following way;—When cold, peel them and cut into long slices, about half an inch in thickness. Place the slices on a shallow dish that has been well-buttered, dredge lightly with flour, sprinkle over them two tablespoonfuls of sugar and half a teaspoonful of ground cinnamon, then a little more flour and last of all some bits of butter and a cupful of milk. Cover and cook in a moderate oven until done, then remove the cover and crown slightly. A sweet potato pie is a fine thing if rightly made and the following is a good recipe:—Mash enough boiled potatoes to make a cupful. To this add a heaping table-spoonful of sugar, one of butter, a pinch of salt, half a teaspoonful of lemon juice and a cup and a half of milk. Bake with one crust and put a meringue over the top in the usual way, being sure to add a few drops of lemon juice to it.

* * * * *

AN EASY WAY TO CLEAN BLANKETS.—Shave a bar of pure soap thin, put it in a small saucepan, cover well with water, and set over the fire to melt. Stain through a colander into a tub half-full of rain water, to which add half a pound of powdered borax. Stir this mixture thoroughly, and put two or three blankets in; let soak over night. In the morning stir the blankets with a stick, lifting up and down, but do not rub. When clean, and free of stains, press the suds from them, and put into a tub of clean luke warm water, rinse and pour off the water, add more, and rinse until clean. Then shake a squeeze, but do not wring. Hang the blankets on a strong clothes line, and let dry. When ready to take down, fold, sprinkle with powdered borax to keep away moths, and lay in a drawer or box. Blankets thus washed will not shrink, and will remain white and soft until worn out.

CINNAMON has a marked antiseptic power. Even the scent of it is said to be fatal to microbes. A decoction should be taken freely by persons living in places affected with typhoid fever or cholera.

VIRTUES OF BUTTERMILK.—The growing practice of utilizing the waste products of all manufactures has brought out the fact that butter milk possesses many unsuspected qualities. A medical paper says its reputation as an agent of superior digestibility has become firmly established. It is, indeed, a true milk peptone—that is, milk already partially digested, the coagulation of the coagulated portion being loose and flaky and not of that firm, indigestible nature which is the result of the action of the gastric juice upon sweet cow's milk. It is of great value in the treatment of typhoid fever, and, being a decided laxative, it may be turned to advantage in the treatment of habitual constipation. It is no less valuable in kidney troubles, from its diuretic qualities. It is in great request for the treatment of diabetes, either alone or alternately with skimmed milk, and in cases of gastric ulcer and cancer of the stomach it can often be retained when no other food can. Chemical analysis shows that in its nature it greatly resembles koumiss, with the exception of which it is the most grateful, refreshing and digestible of the products of milk. Moral, make your own butter and drink the butter milk.

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SOME GOOD COOLING DRINKS.—Currant Shrub.—To one pint currant juice add three pints cold water and sugar to taste; chill with ice. Lemon Tea.—Squeeze all the juice from one lemon, add sugar and

stir till dissolved, then put one scant tablespoon to each cup of tea (cold,) lay a thin slice of lemon in the cup, and if this seems too strong, add cold water till it suits, and of course some ice. Russian Tea.—Place two cubes of loaf sugar in a cup half filled with cracked ice, add a slice of lemon and fill up with cold tea. Ginger Punch.—One quart cold water, one cup sugar, half cup orauge and the same amonnt of lemon juice, half lb. ginger. Chop ginger, add water and sugar, boil 15 minutes, add fruit juice, cool, strain and dilute with water and cracked ice, Fruit Punch.—One quart cold water, two cups sugar, half cup lemon juice, two cups chopped fruit, one cup orauge juice. Boil water, sugar and fruit 15 minutes, add fruit juice, cool strain and dilute with ice water. Lemon Syrup.—Roll the lemons, then press the juice into a bowl, take all seeds out. Remove the pulp from the peels and cover with water and boil a few moments, then strain the water with the juice of the lemons. Allow oue lb. of white sugar to every pint of juice, boil 10 minutes and then bottle. Put a tablespoon or two of this iu a glass of water with cracked ice aud you have a pleasant cooling drink.

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HOW TO REMOVE STAINS.—Tea and coffee usually readily yield to the purifying influence of boiling water poured through the fabric so, too, do some fruit stains. An application of lemon juice and salt, with good sun exposure, is an old and in many instances an effective remedy. Greeu stains usually can be removed by dipping in alcohol, and an application of paste made of cream of tartar wet up with water will remove them when alcohol will not. So, too, cream of tartar and water will remove iron mold spots, drying on the grass iu the sun. If one application does not remove, repeat. Soaking in sour milk over night will usually remove ink stains, while the juice of a rice tomato is useful in removing stains from the hands. Kerosene will clean many stains from old cloth, brass or copper. Surfaces that would be marred by sand soaps can often be nicely cleaner with kerosene, followed by an application of hot soap suds. But the stand by when all other remedies fail to successfully remove stains from white fabrics is javally water. It is easily made, and once used no housekeeper will be without it. The formula is as follows:—Four lb. bi-carbonate of soda, and lb. chloride of lime pour over the soda, one gallon of boiling water, place over the fire and boil 15 minutes, then stir in the chloride of limo until thoroughly dissolved. Allow to cool aud settle, then strain through cloth, bottle and set aside to use. To remove stains, wet the stain in cold water, dip up and down until the spot disappears, then wash as usual. Do not use cn colored materials, as it will destroy color. It will remove ink stains better than auy other preparation we ever tried. One teacupful of this liquid to a boiler of water whitens garments that have grown yellow from disuse.—*Journal of the Jamaica Agricultural Society.*

CHEMISTRY AND AGRICULTURE.

The following paper was read before the Farmer's Conference at the Agricultural College, Gatton, Queensland, June, 1897 :—

IMPORTANCE OF CHEMISTRY TO AGRICULTURE.

"Professor Warrington, in a lecture receutly delivered before the University of Oxford, draws attention to the great difference in the positiou of agriculture at the present day and a hundred years ago. He says—

A hundred years ago agriculture was an art, having only few points of contact with natural science. At the present time both the materials and the operations of agriculture have been so far examined and elucidated by patient scientific investigations that we may now give the title of agricultural science to this edifice of true theory

This is undeniably true, but agriculture will always remain an art if we consider that art deals with practical ways and means to accompalish certain things.

Science again gives us the explanation of these ways and means, so that really art and science have to work hand in hand to maintain agriculture iu its present eminent position.

The science which helped agriculture more than any other is undoubtedly chemistry.

No other science, electricity perhaps excepted, has made such wonderful progress in the present century as chemistry; aud there is hardly, in the present time, any occupation or industry iu which chemistry does not play au important part.

Let us briefly consider what chemistry is. You all know that man, with all his science and wonderful appliances, has never and will never succeed in creating matter, any more than he can destroy existing matter.

All the bodies which surround us, the air we breath, the food we consume, the clothes we wear, the earth on which we grow our crops, are all composed of a few distinct constituents, which at present cannot be further decomposed and which are called the elements.

Only a few of these elements exists in nature in an uncombined state. The most of them are combined in such a wonderful manner that no one would suspect such combination, judging only by the ordinary senses. Who would, for instauce, suppose that starch, cane-sugar and cotton are simply composed of carbon and of water.!

The science of chemistry has to come to our aid to tell us the nature of these combinations, and which elements take part in their formation.

Chemistry further tells us in which manner we can force the elements or combinations to unite and to form new bodies.

Chemistry also proves that all things are formed out of pre-existing matter. A plant which grows is not a creation but simply a transformation of other existing bodies. Again, when a plaut decays in the ground, or when a tree stump is burned, the bodies which took part in their formation are not lost by simply transformed into other bodies, which, in their turn, will again be assimilated by other growing plants.

Emerson, in one of his essays on farming, says—Who are the farmer's servants? Not the Irish, nor the coolies, but geology and chemistry, the quarry of the air, the water of the brook, the lightuing of the cloud, the castings of the worm, aud the plough of the frost.

That chemistry is to be the servant of the farmer is now universally recognised, and consequently we find amongst the staff of Agricultural Departments a large number of chemists.

In the United States a very great number of agricultural experimental stations and agricultural colleges exist, and I may mention that, for instance, at the New York Agricultural Experimental Station out of a total number of 16 officers 7 are chemists; at the South Dakota Experimental Station, and also at the Virginia Agricultural College out of 8 officers 3 are chemists; and at Alabama Agricultural Experimental Station 4 out of 11. In the Southern Colonies, besides, the agricultural colleges and experiment farms with their staff of experts, exist agricultural laboratories with chemists in charge and several assistants.

The work to be carried out at an agricultural laboratory is very large and of a varied nature, and consists chiefly in the following :—

Analyses of soils.
Analyses of waters, chiefly irrigation waters.
Analyses of manures.
Aualyses of foods and food-stuffs.
Analyses of dairy products.
Analyses of plants, fruits and grains.
Experiments with wheats and testing them as to milling qualities, &c.
Practical experiments in the field.

Investigations about stock-poisoning.
Experiment and analyses of insecticides.
Preservation of meal and other products.
Experiments and investigations in agricultural industries, as sugar, wine, tanning, &c., &c.

The value of soil analyses to the farmers has been much discussed. Some authorities deny all value, and others again put too much faith in it. The truth must lie somewhere between these two extremes.

Chemical analysis alone is very often misleading, and I have analysed soils which, according to the analysis, should be first-class soils; but which as a matter of fact would not grow anything on account of their heavy clayey nature. This adverse property would, of course, have been found out by the mechanical analysis, which at the same time would point out that these soils could be improved by draining or green manuring.

Very often the analysis of a soil shows its deficiency in certain necessary constituents.

It is principally the want of nitrogen for which many of our soils in Queensland suffer, and this perhaps, has to be attributed to adverse climatic conditions. The advantages of green manuring have been known for a very long time, but the scientific explanation of the fact that nitrogen is assimilated from our atmosphere by the help of the root-nodules of leguminous plants is only a recent discovery made by Professor Hellriegel. The active agents of this wonderful process are *Bacteria* found in these root-nodules.

Our farmers will find no cheaper or better way of supplying this want of nitrogen to their soils than by green manuring with leguminous crops; and the cow-pea (*Dolichos sinensis*), introduced from America by Professor Shelton, seems especially suited for this purpose, and yields excellent crops in different parts of this colony.

A crop of cow-pea grown in the Mackay district could be ploughed under after eight week's growth. This crop weighed 9·7 tons, (vines and roots) per acre, and supplied to the soil per acre 2·87 tons organic matter, 150 lb. of nitrogen, 35 lb. of phosphoric acid 96 lb. of potash; these ingredients representing a manuring value of £ 5 per acre.

The analyses of waters, chiefly water used for irrigation purposes, is important, as very often the water during its passage through the earth may take up constituents which are detrimental to plant life.

The analyses of artificial manures is undoubtedly part of the most important work of the agricultural chemist.

It is of the greatest importance to the farmer to know if he really receives value of his money spent in manures, and it is a great pity that the fertilisers Bill, regulating and controlling the sale of manures, was not passed by the last session of Parliament.

The farmer cannot afford to experiment with various manures, and in the choice of his manures he should be guided by the analyses and by practical results obtained at experiment stations.

Another important branch of the analytical work is the analysis of dairy products, foods for our own consumption, and feed-stuffs or fodder for our cattle.

Interesting experiments can be made with regard to the preservation of fodder in silos, which would show how far the nutritious value of the fodder is influenced by storage.

With regard to the testing of wheat, a large amount of work has been done in the New South Wales Agricultural Department by Dr. Cobb and Mr. Guthrie.

Of course it will be necessary to repeat these experiments with our own wheats. Over 300 varieties have been sown at the College farm. All of these will need testing, and this will involve a great deal of work during the coming year.

A great many interesting investigations can be carried out with regard to stock-poisoning, and to the yield of some of our native plants in volatile oils, valuable extracts, gums, resins, &c.

Very important also are experiments and investigation in our Agricultural industries, in which chemistry plays an important part. Amongst the foremost of these, stands our sugar industry.

The chemists is not only necessary for the cultivation of the cane crop by trying to improve its quality and quantity, and regulating and controlling the cutting of the cane, but he is also the principal man in the mill in order to control the losses and direct the process of manufacture. Other industries —as, for instance, preservation of meat, butter, and other products for export—will also come more or less under the control of the agricultural chemist.

But let us not forget that analysis alone cannot decide everything, and science alone is not sufficient for successful farming.

Experience and practice are absolutely necessary. The chief aim of the Agricultural College about to be started, is to teach our youths both the practice and science of agriculture, and thus to turn out useful, practical farmers, who can direct and investigate the why and wherefore of the necessary practical work by the elements of science."

[In the discussion on this paper it was stated that there was a general opinion among farmers that fertilizers put on land were apt to be largely carried away by draining—especially such chemical as nitrate of soda. Drainage waters had been analysed after such application and had been found to contain a large amount of fertilizing materials. Green manuring was strongly advocated and a dressing with "Cow-Pea" was stated to have a manurial value of £5 per acre.—J. H. H.]—Extract *Queensland Agricultural Journal*, July, 1897.

BARNYARD MANURES: WHAT THEY DO FOR THE SOIL.

Barnyard manure and other vegetable matter decomposing in the soil have more or less indirect action as a manure in that they are instrumental in decomposing the insoluble mineral compounds with the result of making potash and phosphoric acid more available. Their action in this way, however, is only secondary and of minor importance. The leading articles used to improve the physical condition of soils are barnyard manure and other coarse residues of plants (such as straw, cow peas, velvet beans and green crops plowed under for manure) lime and ashes. Of these, barnyard manure and other material of its class, improve the water holding power of sandy soils because of their property of holding large quantities of water in themselves in much the same way that a sponge absorbs and holds water. Thoroughly mixed with clay soil they assist in making it, more porous and open. It thus becomes more permeable to air, less retentive of water and less liable to cake on dying. Vegetable matter has also a warming Influence on soils. Because of its dark color it makes them absorb heat more readily and by assisting the escape of water in clay soils reduces the cooling effect of the very large amount of evaporation which otherwise takes place. The purpose of barnyard manure and litter is improving the physical condition of soils will be best served by applying that which is more coarse and straw-like to clay soils. Lime and ashes improve the physical condition of sandy soils by binding the particles together and, especially the ashes, by filling the spaces between the sand grains with its fine particles. They improve the physical condition of clay soils by making them more porous and open.—*Journal of the Jamaica Agricultural Society.*

Rose Culture in Turkey.—We learn from a Constantinople authority that in order to encourage the cultivation of Roses, and thus to assit in the production of perfumery (attar) through out the empire the Minister of Agricultre has distributed 100,000 Rose-trees, of good variety, to agriculturists in seven of the Turkish provinces. In addition to this, loans on easy terms will be made to such producers as require new apparatus and stills, or these will be sold at the lowest possible prices to such as prefer to purchase outright. This assistance does not come too soon.—*Gardeners' Chronicle.*

RUBBER IN BOLIVIA.

Sir Martin Conway has just been lecturing before the Society of Arts, on February 2nd, on some of the Undeveloped Resources of Bolivia and from this we quote a very interesting chapter, as follows :—

It is only since 1878 or thereabout that the existence of rubber in the eastern forest region has been known. Legislation was passed in consequence of the discovery, defining the manner in which these lands may be acquired. A small annual rate per *estrada* must be paid to the Government, and the lands taken up must be registered with a map of the area. The annual rent may at any time be commuted at a fixed rate, after which commutation the land becomes the freehold property of the purchaser. If the annual instalments are not paid the land lapses to the Government. Thus the Mollendo rubber forests ought now to be owned on an indefeasible title, and many of them are so owned. The titles of others are defective, either because there has been irregularity in the payment of rent, or from mis-description in the deeds of registration. The map accompanying the register often includes a very much larger number of *estradas* than the claimant has scheduled or paid for ; and this of necessity, for no one can count or correctly estimate the number of *estradas* in an area which has not been explored in detail. Again, the maps themselves are inaccurately surveyed. Thus a multitude of questions may be made subject of dispute. In other cases, I am told, persons have obtained legal possession of a number of *estradas*, patched about, and now claim to own all the land included between those *estradas*. The question of title is therefore one that in any particular case needs close investigation on the spot. Up to the present time, however, none of these titles have been contested, and it does not appear to be the interest of any individual to contest them, whilst the chief interest of the Government is to induce men of capital to work the forests, introduce immigrants, develop lines of communication, and so increase the general trade and prosperity of the country. It is not likely, therefore, that the Government will attempt to upset titles even if they are not absolutely satisfactory, provided that the forests in question are properly worked.

Time fails me to speak of the

COFFEE, COCOA, AND COCOA PLANTATIONS

of the sugar estates, and the vine-yards. I can only deal very briefly with the india-rubber forests. In the great eastern plain and low hills that flank the Rio Beni, and still more in the little explored districts to the north and north-east, are immense rubber forests, whose exploitation on any large scale is for the future. It cannot be undertaken profitably until the route to the Amazon is opened up and made easy. Some rubber goes that way, but the difficulties and distances are very great. That the day for this region will come may be prophesied confidently, for the enormous and ever increasing demand for rubber made by modern electrical and other industries, renders the development of increased sources of supply a very important matter. From a recently issued United States Consular Report on the Resources and Trade Opportunities of the Amazon Valley, I quote the following important passage :—

"I have learned that some accounts which have been written concerning RUBBER, although not entirely misdealing, have not been quite accurate. The impression created by the narratives of previous travellers who have been up the Amazon is that the rubber production is on a constant and endless increase. It is not generally believed, but it is nevertheless a fact, that the output is not likely to increase to any marked degree unless a much larger force of rubber gatherers is sent into the forests than has been employed during the past year or two. This is the opinion of the best informed rubber-plantation owners. Reports that the supply of rubber trees is inexhaustible are largely overdrawn. It is true that there is no fear of immediate scarcity of rubber, and perhaps there will not be for the next 50 years. It is believed in well-informed circles that hereafter there will be a gradual but steady shrinkage in the rubber product, unless the present force of rubber gatherers is largely increased, because in the first place, the trees conveniently located near the banks of the rivers are naturally the first to be worked and in consequence are becoming exhausted from constant tapping, the milk extracted being weaker each year ; hence the shrinkage in such rubber is very great. In the second place, the rivers have all been worked inland for a distance of about three miles from their banks, and, in order to reach the so-called unexplored rubber forests still further inland, it will require much more time and necessitate three times as strong a force. Owners of rubber farms inform me that milk drawn from rubber trees five years ago possessed twice the strength contained in that extracted from the same tree today. The islands near Para are all over-worked. Good judges can easily recognise rubber drawn from overworked trees by its peculiar colour."

If, therefore, the supply of PARA RUBBER does not show signs of increase, the importance of developing other sources of supply becomes obvious. The following observations upon the forests of so-called Mollendo rubber are the result of my own observations and enquiries, in which I was much helped by Mr. M. Martindale, an English gentleman, whose acquaintance I made in La Paz, and whose long experience of the country was unreservedly placed at my disposal. I have recently heard of his tragic death. He was killed by the fall of a tree in the Mapiri forest.

In the European markets a certain brand of india-rubber is sold under the name of MOLLENDO RUBBER. Of course no rubber trees grow at or anywhere near the Peruvian port of Mollendo on the Pacific coast. The name applies merely to the rubber which is shipped from that port. All the Mollendo rubber comes from the Bolivian province of Larecaja, the forest-clad valleys of Mapiri, Tipuani. Coroico, Challana, Zongo, &c., which descend north-eastward from the Bolivian Cordillera Real. The rubber is brought over various passes to the Bolivian Puna, shipped from Chililaya on Lake Titicaca by steamer to the Peruvian port Puno, and carried down by the Arequipa railroad to Mollendo. All Mollendo rubber comes from the valleys above mentioned, and all the rubber produced in those valleys is exported through Mollendo. The statistics of the rubber exported from Mollendo thus form an impartial record of the production of the Cordillera valleys.

The following are the statistics of the Mollendo rubber exports for a series of years :—

	lb.
1893-4	37,587
1894-5	80,734
1895-6	251,341
1896 7	292,121
1897-8	491,087

The statistics of the year 1898-9 have not come to my hands, but the output was very much larger than in the preceding year, and the industry is gradually developing. The quality of Mollendo rubber, as judged by its price, is nearly equal to that of Para rubber, which is the best in the world. In the year 1898, Para rubber in the English market varied in price per pound from 3s 5¾d to 4s 4½d, whilst Mollendo rubber varied from 3s 4d to 4s 1½d. Considering the importance of india-rubber at the present time, it appears likely that some account of this little known forest region may be of general interest.

It must be borne in mind that the area under discussion does not include the Rio Beni and the region of the plains about it. The rubber that comes from the Beni is carried away to the eastward, and emerges into the light of commerce as Para rubber. It is only the forests of the lowest eastward Cordillera slopes that are comprised in the Mollendo district. The rubber trees there are stated to be of the *Siphonia elastica*, a large forest tree, approximately as big as an average English elm. These trees are self-planted. They grow in clumps, or *estradas*, of from 100 to 150 altogether, and these clumps rise well above the other forest trees, and can be seen from afar, so that the richness of any area can be judged by a general oversight from a commanding position.

In most parts of the world RUBBER-PRODUCING TREES grow in a swamp, a condition which renders rubber forests direfully inimical to human habitation. In this respect the Mollendo rubber forest is fortunate exception, for by all accounts it is not unhealthy; so, at all events, I was informed by an Irishman and a German, both of whom had spent the best part of from ten to twenty years in the forest. There are, of course, unhealthy places, but the forest is not generally unhealthy. The reason is that the trees do not grow on level swamps, but on the sloping sides of deep valleys or *quebradas*. For moisture they depend upon the almost constant cloud that hangs over them, and is formed by the cold air pouring continually down from the adjacent snowy Cordillera. This cloud is a geographical feature, and its lower limit appears to be the exact boundary of the Mollendo rubber forest. The upper boundary is a contour line at approximately the 3,000 feet level, above which altitude the tree will not grow.

The main valleys in the rubber zone are traversed by navigable rivers. The difficulty of transport begins at the upper limit of navigation, whence the rubber has to be carried by toilsome tracks over the high passes of the Cordillera. At present there are no roads and no mule-paths worth mention. There are a few tracks traversable by mules with difficulty. The best are the Mapiri and Tipuani trails which converge on the town of Sorata after surmounting passes of 16,000 feet altitude. The part of the forest which has thus far been best opened out is the area worked by these trials. Up to the present, therefore, Sorata has been the chief centre of the industry. The Challana and Zongo forests will not be properly worked till better tracks have been made over the two passes north and south of Mount Condoriri and down the respective valleys. Such mule tracks could be easily made at a relatively small cost. When that preliminary work is done the production of Mollendo rubber will rapidly ncrease.

At present the main impediment to the development of the industry is not the difficulty of carrying out the RUBBER, but of carrying in the necessary supplies; for it is important to remember that the forest region is practically uninhabited, and the amount of cultivation is very small. A tropical forest left to itself produces little food for man. At one or two points by the river banks, where gold-washing is carried on, there are small Indian villages; but the inhabitants are fully occupied, and have no time to spare for winning the rubber. Both labour and food have therefore to be imported from the high Bolivian plateau by the same route that the rubber retraces on its way to export.

We are thus brought to consider the important question of LABOUR. In the department of La Paz there are reckoned to be over 300,000 Indians, msot of whom inhabit the high plateau region. These people are agricultural labourers who work, under a kind of manorial system, for what corresponds to a very low rate of pay, a starvation wage, in fact. They cannot be described as an industrious folk, but they are extravagant, and their extravagance of expenditure on festivals and especially on festal raiment of a costly and gorgeous character, leads them to temporary emigrations from home, to which they are also frequently driven by dire necessity. They are wont under such circumstances to pledge their labour in advance, and their extraordinary honesty makes the avoidance of their pledge an event of extreme rarity. Employers needing labour secure the services of agents who visit Indian villages, and either directly or through the corregedors or presidents of the villages, enlist the required workmen. Payment is generally made in advance, for the Indian has to leave money with his family and to provide himself with food for the time of his absence in the forest. He transports the food either on his own back or on that of his donkey, and sometimes he takes his wife and family with him. He contracts either to work for so many days or to bring out of the forest so many pounds of rubber. The time spent by him on the journey to and fro is not paid for. In the case of a mine or other enterprise that has been running for some time, a certain number of Indians become habituated to working for it, but they generally do so only for portions of the year, returning at stated intervals to their homes for the purpose of pursuing the cultivation of their lands. All depends upon how the Indians are treated by their employers. If they are well treated they will return and bring others with them, even without payment in advance, if provisions are supplied to them at the place of labour. The system is not a very satisfactory one, and is not capable of indefinite extension, though undoubtedly if the forests were worked on a large scale, and the Indians were well treated and punctually paid, a change in their habits might be brought about. It is not, however, probable that the forest region could ever be colonised by plateau Indians, the difference of climate and level between the two countries being so strongly marked. Whenever an organised attempt is made to exploit the splendid forests on a large scale, foreign labour will have to be imported, and it will be necessary to seek Chinese coolies in San Francisco, or Italians from Buenos Ayres, or to fetch Hungarians from Europe. Such colonists would live in the forests and would cultivate the ground as well as work the rubber trees. Their labour would be supplemented by that of Indians, but a steadier industry would be the result.

THE METHOD OF EXTRACTING RUBBER is one of the simplest crafts in the world, and can be learnt by the most ignorant in no time. The process is as follows:—The workman, starting out very early in the morning (for when the sun is high the trees cease to bleed), carries with him a number of little tin cups, called *tichelas*. Arriving at a tree, he makes one or more small incisions in the bark, and below each attaches one of the tin cups by pressing it into the soft bark. The number of incisions that can be made in a tree at one time is variously stated. A strip of the bark all down the tree, one-third of the circumference in width, must be left unbroken, or the tree will be liable to bleed to death. The cup, of course, collects the drops of sap that bleed from the wound in the bark above it. Ultimately the wound in the bark is covered by a film of dry sap, which also is afterwards collected. The workman proceeds from tree to tree, attaching his cups, till he has tapped from seventy-five to one hundred and fifty trees in his *estrada*, according to his industry and the nature of the ground. After the hour when the sap ceases to run the man goes round again, carrying a tin vessel with a cover, into which he pours the milk that has run into the *tichelas*. When all the *tichelas* have been emptied, the man returns to his *barraca*. Some collectors tap the trees in the morning and return to collect the milk in the evening, whilst others tap in the evening and collect in the morn

ing. At the *barraca* the collector lights in his hut a fire of palmwood, with which the nut of the Montacu palm is mixed, if it can be obtained. He places a funnel over it to collect the smoke, and then, taking a kind of small wooden paddle (something like a squash racket bat) in his hand, dips the broad end into the milk, which covers it with a thin layer. He now holds the paddle over the fire in the smoke, turning its faces alternately to the heat. The layer of milk is thus rapidly smoked and coagulated into hard cured rubber. The paddle is then dipped into the milk again and the process repeated until a large cake has been formed. When the cake has reached a convenient size it is slit down the sides and stripped from the paddle. The figure-of-8-shaped lumps thus formed are ready for export. They still contain about 7 per cent. of water which gradually dries out in the next few mouths, and for which allowance must be made in weighing. In the Mapiri district, it is usual to cure the production of each day separately, so that each collector's work can be controlled. Moreover rubber so cured can be easily tested for cleanness and purity. Lower down the Amazon the custom is to smoke one day's rubber on top of the previous day's, making larger *bolachos*, into which dishonest workmen more easily introduce stones and other adulterations.

THE AVERAGE AMOUNT OF RUBBER which one collector produces on one day is very variously stated. On the Lower Amazon 7 lb. daily is the figure quoted, on the Upper Amazon 21 lb. daily. In the Mollendo district the lower of these figures does not appear to be reached under present management. To this cured rubber must be added the scraps and remnants called *sernambi*, which include the cicatraces of the incision of the bark, the cleanings of the *ticheles*, &c. The amount of the *sernambi* is equivalent to about 10 per cent. of the smoked rubber; its price is from 15 to 20 per cent. less than the price of smoked rubber.

The *pica* or RUBBER-HARVEST is collected twice a year in the Mollendo forests, from April to July, and from October to March. It appears that a single tree can only be tapped during three months of one year, and then needs nine months' rest. If thus treated, and if a good broad strip of bark is left untapped from bottom to top, the health of a tree does not seem to be interfered with. For how many years it is possible to go on tapping a single tree we do not yet know. There is a tree in the barraca Cristina, in Senor Violand's San Antonio estate, which was stripped of all the bark on one side, and yet had yielded milk from the remaining bark during six *picas* in six successive years; the tree still retains a throughly healthy appearance. It is certain that the life of a tree, though annually tapped, is a long one, and exceeds the fifteen years which are required for the growth of a tree from seed, so that the forest may be perennially tapped, and will give a fairly constant yield when thorougly opened up and worked. This, however, implies that the trees are carefully handled; the yield of a mishandled tree falls off. The average yearly output of a fullgrown tree is variously stated. Some put it as high as 7 lb.; no one puts it at less than 3 lb. of cured rubber (after 10 per cent. has been deducted for drying).

THE COST OF PRODUCTION in Bolivian dollars for 100 lb. of Mellendo rubber in the Mapiri forest is as follows:—

	Dols.
Paid to contractor per 100 lb	73·00
Loss in weight, 10 per cent.	7·30
Freight from the forest to Sorata town	5·00
Commissions and road tolls	·60
Cost of administration	10·00
Sacking, packing, commission, and freight to Chililaya on Lake Titicuca ...	2·20
Freight, insulance, and incidental expenses to London	12·00
	110·10

Or reckoning the Bolivian dollar at 18d., the cost of 1 lb. of Mapiri rubber put in London is 19·82d.

From the books of two other forest owners in the same neighbourhood I find a slightly higher cost, 20·16d. per lb. The present price of this rubber in London has now risen, as above stated, to 4s. 1½d. per lb.

Coming now to a consideration of the possible SUPPLY OF RUBBER to be drawn from the Mollendo forests, we enter a region of conjecture, for of course the trees have not been counted nor even the number of *estradas*. A part of one estate has been recently proved to contain 6,410 *estradas* (961,500 trees), when, according to the original estimate, the whole estate contained only 500,000 trees. Five million trees may be taken as the lowest probable limit of the number of trees, whilst they may not improbably turn out to reach 10,000,000 or even more. Now in the year 1897-8 the amount of Mollendo rubber exported was 491,087 lb. which at 3 lb. per tree, represents the yield of only 163,695 trees, and the same number of days' labour at 3 lb. per man per day. If one Indian is taken as working for three weeks, this represents the labour of only 7,795 Indians out of a population of 300,000 in the department of La Paz. At the lowest reckoning, therefore, the output of Mollendo rubber might be increased 30-fold without planting a tree. How is this development to be attained?

Without going into financial questions concerned with any possible purchase of the estates and concentration of them under single management, a few essential features of the problem may be pointed out. To begin with, the first necessity is to make good mule roads over the high passes that lead from the town of Sorata and from the Bolivian plateau to the chief eastern valleys and down those valleys to the forests. These roads would, of course, be very useful to the gold miners, coffee planters, and others whose work leads them to the eastward. They are, therefore, rather work for the Government than for the rubber-forest proprictors; but the Government is poor and cannot afford to make them. If made at all, in the immediate future, the forest proprietors must make them. The main roads having been made, it is necessary to cut forest tracks from one *estrada* to another, as only the *estradas* easily accessible have yet been touched. This implies additional labour, wise oversight, and intelligent exploration.

At present all the food consumed by the rubber collectors has to be carried in to the forests from Sorata or the plateau—a great waste of labour. It would be perfectly easy to raise any quantity of food in the hot valleys, which are of the richest natural fertility; but such cultivation implies preliminary colonisation. As already stated it would be impossible to colonise these low, hot valleys with Indaus from the Tibet-like plateau. Chinese coolies are the class most suited for such work. They could be obtained very easily from San Francisco. A nucleus of such men, who would soon become expert in working the rubber forests, would enable the industry of rubber collection to be far better organised than it is today, and opportunities of theft would be reduced. Large areas in these valleys which do not carry rubber are suitable for coffee plantations, and such plantations as do exist produce the finest coffee of South America, and some of the finest in the world, so that here also important future developments may be expected. What is true of coffee is true also of cocoa, for which a large local market exist among the Indians of Bolivia. Such developments of the rubber industry imply, not merely concentration or co-ordination of proprietorship, but skilled administration and scientific experience, which could only come in the wake of capital. At present everything is done experimentally, or by rule of thumb.

The Bolivian Government would certainly favour such an enterprise providing that roadmaking and

colonisation were an essential feature of it. With their help the business of recruiting Indian labourers would be greatly facilitated, for the village corregidors have much influence over the Indians, and can promote or hinder their enlistment or turn them in one direction or another very much as they please. Under any circumstances, however, the future of this region of tropical valleys, descending from the eastern face of the snowy Cordillera Real of Bolivia is certain to be prosperous, and its development will attract much attention.

From the Discussion which followed the reading of the paper, we quote as follows:—

The Bolivian Minister said: The production of rubber was even more important than the figures quoted would indicate. Sir Martin Conway spoke of 1,000,000 lb. as the export from Mollendo, but that did not include that exported by way of the Madera river, which was so considerable that it brought the total export in 1898 up to 3,100,000 kilos., or in value about £1,100,000.

Mr. R. Kaye Gray confirmed what had been said by the Bolivian Minister and Colonel Church, that the greater part of the rubber from Bolivia came down the Madera; the quantity which came down *viâ* Mollendo was insignificant. He had been to Lake Titicaca, but could not pretend to know the district. It was certainly a great advantage to have railway communication as far as the lake: but as that stood at an elevation of 13,000 feet and all produce had to be taken to that height, that route did not seem well fitted for commercial purposes. Some years ago he met Mr. Martindale, who was much interested in trying to develop the rubber industry on the eastern slopes of the Andes, and in discussing the matter with him he came to the conclusion that the labour question, including transport, was the chief difficulty. Still, Mr. Martindale had been able to do something, and the rubber was certainly very good, fetching about 2d. a pound less than the finest Para, and 3d. less than what was known as Bolivian rubber. The inferior quality and scraps probably did not pay for carriage. Being interested in rubber, and finding it very difficult to turn out electric wires and waterproof garments with Para rubber at 4s. 5d. lb., he should rejoice at any development of the production of good rubber.

Mr. R. H. Biffen asked if Sir Martin Conway could assure him that the rubber trees he had spoken of were really the *Siphonia elastica* of the Amazon, because from the description given, it hardly seemed likely. As known in the Amazon valley, that species always grew on soil which was flooded part of the year, and when transported to Ceylon, where the situation was somewhat similar to that described in Bovilia, the trees did badly, and the yield fell off very much.

Sir Martin Conway, in reply, said he was not a botanical expert, and unfortunately the specimens he brought home were lost *en route*, so that he could not get them identified. The statement was based on the report of the British Consul, Mr. St. John, who visited Bolivia three or four years ago, and he said that he got his information from an expert, but he could not ascertain his name, and could not therefore affirm positively that the identification was complete. But it grew under conditions practically similar to a swamp, inasmuch as there was rain falling daily from a permanent cloud. It was a very unusual climate, if not quite unique. The amount of Mollendo rubber exported was not quite insignificant, for it amounted to over three million pounds; over half a million came from the small district over which alone he had an opportunity of examining, near Sorata. Of course the great forests in the neighbourhood of the Beni river could produce a vastly greater quantity than the little district he had mentioned, and its full development could only result from the opening up of the Amazon route. As for railway development generally, there was the line from Antofogasta to the shore of Lake Titicaca, and the whole area alongside it was very rich in minerals. Sicasica, half-way between Uroro and La Paz, was also a rich mineral district, but it produced practically nothing, for lack of means of transport. Even fuel had to be carried up if the mines were to be worked. He did not believe there would ever be a trans-Andean Railway. It had, however, only cost a few hundred pounds to make the mule tracks necessary to work the little district he had referred to. With regard to labour, there were plenty of Indians, but you cannot get them to stay at work more than three weeks at a time, and therefore it was very difficult to organise the proper cultivation of the rubber industry. It could only be done by importing colonists, who would not only look after the rubber, but cultivate the ground and provide their own food.
—*Journal of the Society of Arts*, Feb. 2.

HOW TO PUSH CEYLON TEA ON THE CONTINENT OF EUROPE AND ELSEWHERE.

THE TRI-LINGUAL LETTER ON TEA;

Our tri-lingual letter on "Ceylon Tea"—of which the "Thirty Committee" has given 10,000 copies to Commissioner Renton for use on the Continent of Europe, attracted a good deal of attention during our recent visit to central and northern France and Belgium, as also among London City merchants dealing in tea with the Continent. It may be of interest in view of the "Thirty Committee"'s order, to recapitulate some of the English opinions kindly given to us when we were trying to improve the circular letter; and at the same time to publish certain information respecting tea generally which should be of interest to tea planters. We first quote a sentence from the letter of Mr. Herbert Anderson, of the Dimbula Company:—

I thank you for yours of November 20th, enclosing copy of circular letter for the Continent, which is very much to the point, and ought to answer the purpose, especially as it shows how the revenue may be increased by absorbing our teas.

Mr. Anderson was good enough to point out a couple of misprints in our figures which were at once corrected. Mr. H. K. Rutherford was good enough to write:—

You are indefatigable in your exertions to advertize Ceylon, and this latest idea of having your article on Ceylon Tea translated into the continental languages is a very happy one, as it should undoubtedly draw attention to the advantages to be derived by foreign Governments in lowering the duty on tea. I return the paper and cannot suggest any alteration as it puts the matter in a very telling way.

Messrs. Fredk. Huth & Co. (Tea Department) 27, Mincing Lane, wrote:—

We have to thank you for your very interesting circular, the distribution of which on the Continent would be probably of assistance to the trade in general, but scarcely to the benefit of Ceylon teas only, as the dealers and packers no doubt will continue to buy such teas that suit their taste and pocket.

We now turn to a long communication sent to us on the eve of our departure from England, by a well-known London merchant connected with the Indian tea trade.

THE TEA CAMPAIGN IN AMERICA AND THE CONTINENT.

From the long letter of a London merchant closely connected with the Indian tea trade, we quote largely as follows and also give our reply to the same :—

Since I was in Colombo four years ago, I have had the *Weekly Observer* regularly, and came to the conclusion long ago that it would be a good thing for both of us to meet. I have always recognized the honest and good tone of your paper, in contrast to that of some special subject papers, the desire of which seems to be always to conceal the truth and write only what is likely to be palatable to their readers. There were a great many things in your letter of 6th October (published in your paper of 26th) which I should have liked to discuss with you, but which it is most difficult to deal with in correspondence without being tediously long.

TEA DUTY AND CONSUMPTION.

Now to take up your tri-lingual paper on Ceylon Tea. It will no doubt have some effect if it gets a good circulation, especially in German-speaking communities and in Russia. I do not quite agree with your argument that the increased consumption of Tea in the United Kingdom arises from the reduction of the duty,—at least so far as relates to the adoption of a uniform duty of 6d per lb. on 1st June 1865, afterwards reduced to 4d per lb. on 1st May 1890. There has no doubt been a very material increase in the consumption, but it has been a uniform and steady one practically throughout this century, and to my mind the increase has arisen very largely because of the higher and more extravagant scale of living which the last half-century has brought about. Tea 50 years ago was to a great extent a luxury of the rich ; today it is a necessary of the poor. Then a very material point in the question of increased consumption is the fact that not only has the first cost been reduced, but the distributive costs and profits have gradually been materially cut into, and consequently the retail selling prices are remarkably low, in fact, they are so low that I do not believe the abolition of the existing duty would have a great effect in giving a further stimulus to consumption, although of course, if the price were lower there would probably be a great deal of waste. I look upon the average consumption per head of the population as having now nearly reached its possible maximum, because an average allowance of 6 lb. per annum amounts to a great deal in the liquid equivalent. I consider that the higher average shown by the Australian and New Zealand Colonies does not mean more liquid tea. A great part of it goes in waste because of the rough-and-ready way of the colonial and because of the method of making. Besides, in those Colonies the consumption is almost entirely the lowest class of tea which can be got from China, India or Ceylon, the liquid equivalent from which is often not more than half what the Irish people get from high-class Indian Broken Pekoes, which do not cost double the price per lb. In proof of my argument that the increased use of tea in this country arises largely from the more extravagant living of all classes, I would refer you to the increase in the consumption of nearly all those goods which pass through a general grocer and provision dealer's stock, also of butcher meat.

Now as to forcing Tea on countries where it is not consumed at present. I am always amazed at the calmness and the confidence of many of your planters in regard to such things. I should say that if you took an average citizen of Europe who had never tasted beer, wine, spirits, tea or coffee, and experimented upon him, he would in all probability pronounce tea to be the most nauseous of them all. The more I travel among foreign peoples, the more I am convinced of the fact that the use of tea is very much indeed a matter of acquired taste. Children are gradually brought up to it and get to like it, but it is very difficult to convert adults from another beverage. You doubtless have seen in Italy the very infant at the breast being offered a sip of the sour wine of the country, and in Germany the tiny children drinking their lager beer with their parents, while in Russia you see them in family groups round the samovar. It seems to me somewhat like trying to stop Niagara to attempt to convert whole nations from the customs of centuries and a great deal of harm has been done in Ceylon and India by overproduction of tea, based on the idea that because the United States of America contain 90 million people (roughly presumed to be Anglo-Saxon, but really a nondescript horde representing all the nations and ways of living of Europe) there was a reserve ground of consumption there which in time might be expected to equal that of Great Britain. During the last 10 years I have over and over again protested against the use of the parrot-cry "Capture the American market," on the ground that there was no American market of material consequence. To begin with, the people of the United States are coffee-drinkers wherever they use hot liquid beverages. A certain proportion are drinkers of the pale, thin, pungent Green Teas of Formosa and Japan, while only a small proportion (principally immigrants from this side, or their descendants) are drinkers of Black Tea. The only market for us to capture was this Black Tea market, and we have been getting it all the time by the displacement of China Tea. It has come to us in a natural way, firstly by the constant inferiority of the China production, and secondly by the serious fall in the cost of Indian and Ceylon Teas, which have gone down to a level that China cannot compete with, in fact, the fall in prices has done far more for us in North America, in Russia and in Persia, than all our efforts of special missionaries and commissioners. The latter have too often only disturbed and interfered with the ordinary course of trade in the usual channels.

"I do not think we can ever make much headway in any of the Latin countries or in any of the Green Tea-using] districts, or in Germany and Austro-Hungary, but I have no doubt that we can make good progress in all the higher latitudes of Europe, particularly in Russia. As to Russia, it seems to me the most gross presumption on the part of some of your people to suggest to the Government of that Empire the reduction or the abolition of duty. It is merely a revenue duty, not a protective one (except in so far as encouragement is given to Russian vessels and to the development of certain new trade routes) and if we can get our Tea in on the same terms as the ordinary China Tea, I have no doubt whatever that we will gradually over-

come the conservativism of the large Russian distributors, as we had to do formerly with those in Great Britain, thus bringing about a gradual transition from the use of China Tea to that of Indian and Ceylon. The high retail selling prices of Tea in many European countries are merely caused by the fact of the very limited demand, and merchants there are largely of opinion that a reduction would not have any material effect upon increasing the consumption, the latter being a question of national taste.

"The whole of the Ceylon men are so comparatively new to the Tea business, that they are continually making discoveries of matters well-known to firms like my own, and it is a pity that they do not allow themselves to be rather more influenced than they are by some of the previous traditions of the Tea trade.

"I have not left myself much room to deal with your editorial of 26th October, and I would just say that the sending of Tea to other centres such as Manchester and Glasgow has been tried over and over again. I have had as much as 5,000 chests in stock in bond in Glasgow at one time, but the practica conclusion I have come to is that you must have one ruling market, and unless you wish to suffer heavily by being at the mercy of a limited outlet of buyers, you must have your Tea available to offer in that ruling market."

REPLY.

It will be seen that our correspondent does not require to use the prayer "Gie's a gude conceit o' one's-self," in regard to some of his opinions. From a reply, written to him by us on board ship we quote:—

"I have your long and interesting letter; but, I do not agree with you on several points. The way in which I have myself seen the use of tea increase among the French (the least likely of people to be converted) gives me great hope for the whole Continent of Europe and the United States. In 1878, the year I first visited Vichy, and saw a great deal of Paris and its people, under the auspices of a relative, Dr. MacCall, founder of the well-known Mission in Paris and other leading towns, when I enquired for tea. I was always referred to the "Pharmacy." I found a change for the better on my next stay in 1887; but now in 1899, there was not a grecer in Vichy (nor I may add in Paris) who did not hold tea; and much more, not a café or restaurant where they did not give it to you, if asked for, at any hour of the day: and *still more*, I saw French families of an evening frequently with the *tea* pot and cups before them, in place of coffee or wine, at the restaurants. Then, as to the United States: can you tell me why the tea-drinkers from the United Kingdom, who have gone by the 100,000 or 1,000,000 to the States, during the past 50 or 60 years, have become coffee drinkers? Simply, because they could not get the beverage to which they were accustomed at home, or rather the quality of tea from which to brew it. I crossed the Pacific in 1884, with the largest buyer of Japanese tea for the United States and he admitted that every pound was artificially 'faced' with deleterious stuff to give it the required colour, and that it would be far better if his countrymen drank pure Ceylon tea; but, he added, their taste won't change in my time (he was an oldish man) and I don't mind your using my opinion. Well, gradually, but surely, the Americans are being won over to English breakfast tea: the figures show a steady increase, and if only there had been no war tax on *tea*, the increase would have been greater.—You mistake my argument in the circular letter as to Russia: M. de Witte, the Finance Minister, has for some years, been trying to improve the condition of the people by getting them to drink tea in place of intoxicating drinks —he has been opening tea-houses under official auspices, or directly encouraging others to do so. Now my point is, that with so heavy a duty it is impossible for the bulk of the people to afford to buy good tea. The duty in Russia *now* is what it was in England when Queen Victoria came to the throne—2/1 a lb. The English duty is now 4d; but the revenue has lost nothing, but has rather benefitted. Now surely, for Russia to begin reducing gradually, should lead to the same result:—increased consumption and increased revenue. As a matter of fact, Russia has a differential duty, in favour of 'overland' teas, which is not fair to tea sent through Odessa. [This has since been rectified.] As regards the burdens on tea in London—between ship and retailer —don't you think an Association of all tea producers is required to investigate and reform the matter thoroughly? Tea seems to be placed at a great disadvantage as compared with coffee."

WANTED A TEA-GROWERS' ASSOCIATION.

LARGE BREAKS DEPRECATED.

JOCATIVE PROPOSAL TO ABOLISH BROKERS!

In regard to the closing remark in our last instalment, emphasizing the need of an Association of tea producers to watch over their interests, we have the following strong expression of opinion from another London merchant connected with Ceylon tea—an opinion which planters would do well to note and endeavour to act on:—

"I think a TEA-GROWERS' ASSOCIATION is badly wanted, and that if it were properly representative of Indian and Ceylon (British) tea-growers, it would be of much advantage to the industry. The mere fact that the growers had organized their forces would have a wholesome influence on the Docks' Committee and Buyers' Association. Nearly every industry has its Association to protect its interests, and why not tea *growing*, as well as tea distributing and tea warehousing? The one weak point, as regards growers, in the tea draft fight was that their forces were much of the 'undisciplined-mob' order."

BIG BREAKS—WAREHOUSE CHARGES—ABOLISH BROKERS.

Finally, from a source whose identity for obvious reasons is not to be revealed, we have the following rather extraordinary if not amusing deliverance:—

"Very large breaks are not a good thing for the producer. They are only wanted by the big brokers and buyers in London to save themselves trouble. Breaks of moderate size bring the best competition in Public Auction.

"The warehouse charges will probably be at once reformed here, and there is another reform which I have jocularly suggested for many years, but I would on no account like my name to be associated with it, because so many of the Tea Brokers are intimate personal friends. I consider that as business is conducted now-a-days, there is absolutely no need of either selling or

buying brokers in the London market. Teas should never be printed in sale unless the owners are prepared to take the value offered by the trade on the day they are selling them, therefore all that is necessary is one public auctioneer to knock down the lots mechanically and a clearing house to collect the proceeds in accordance with the conditions of sale. The whole of this work could be done for a trifling percentage on the value, in fact what goes now for lot money and selling expenses might cover it, and 1½ per cent. upon the total value of the Tea sold would be saved to someone."

Do away with the brokers! The time has scarcely arrived for that. Ceylon planters would rather vote for doing away with *the Blenders* and giant Tea Dealers?

TRAVANCORE TEA ESTATES COMPANY, LIMITED.

The following is from the report of the directors submitted at the third annual ordinary general meeting of shareholders, held at the office of the company on Feb. 21. :—

The directors have to submit the general balance-sheet and profit and loss account for the year ending September 30, 1899, duly audited. The net amount at credit of profit and loss account, including balance brought forward at September 30, 1898, after providing for general expenses, income-tax, &c., is £2,264 0s 8d. Dividends on the preference shares paid December 31, 1898, March 31, and September 30, 1899 (less income-tax), amount to £2,682 10s; less set aside in last account, £536 10s; leaving to carry forward to next year the sum of £118 0s 8d. The results of the past year's working have not materially differed from those of the previous year, as there was no appreciable difference in the amount of crop harvested. The average price for the teas sold in London was 7·18d per lb, as against 6·80d, and the rate of exchange 1s 4⅜d, as against 1s 4 3-32d for 1898. The tea crop was 390,885 lb, as against 382,661 lb in 1898, the yield being 342 lb per acre off a plucking area of 1,146 acres, as against 392 lb per acre the previous year off 975 acres. The coffee crop amounted to 280 cwt. In addition to the factories on Bon Ami and Pambanar, factories have been erected on the Mount and Munja Mully Estates, and these latter are expected to be in working order this month. A factory is now in course of construction on Kolie Kanum Estate, and these five establishments, when complete with machinery, will meet the requirements for the manufacture of tea from the 3,312 acres, of which only one-third of the acreage was in bearing last year. Debentures have been issued to the extent of £33,100, and a further issue will require to be made to bring the tea planted into bearing, and to complete and equip the factories. Mr. W. MacKenzie retires on this occasion from the Board, but being eligible offers himself for re-election.—*H. & C. Mail*, Feb. 16.

THE BOMBAY TEA ASSOCIATION, LD.

The ordinary general meeting of the shareholders of the above association was held for the first year at their premises in No. 26, Church Gate Street, last month, when a dividend of Rupees 7 1-2 per share was declared. The well-known millionaire and Banker, Mr. Purunmull Gulji Singanee, was elected one of the additional directors, and Mr. Fazulbhoy Joomabhoy Laljee, who retired by rotation, was also re-elected a director.

The directors in their report state that owing to the plague, and other unfavourable circumstances which resulted in dislocating and paralysing business of all sorts:—Your directors thought it advisable to suspend all active operations in reference to getting more shares of the company taken up by the public, and to wait till better times come. In the meanwhile your directors think that the result achieved so far is encouraging, and they believe there is a good field for a company like ours, and that if properly managed as they feel sure it will be under the careful and tactful supervision of their agents, Messrs. Morton Maju and Company, it will result in much benefit to the shareholders. It is with satisfaction that your directors state that in spite of adverse circumstances, additional shares to the value of Rupees 26,500 have already been subscribed.—*Times of India*.

PUBLIC SALES FOR TEA: THEIR ADVANTAGES.—We said the other day we should touch on other aspects of the public sale system for tea than that of the capability of the buyer, big or small, for combination with a view to lowering the demand, or for any other action with a similar purpose in view. But a correspondent now sends us a few remarks which so exactly sum up the situation as it appears, we believe, to most Colombo buyers that we have no hesitation in giving them prominence:—"To a certain extent it must be true that a big (very big) buyer has the market at his mercy. But what alternative would the seller suggest? Do without the big buyer?—and see where his prices would go! You have only to see what happens even in Colombo if, say, Russians are not buying much,—why the market is not nearly so 'brisk' and prices *may* shew a decline! But it would be unfair to say the Russians were combining to bring prices down. It is a far more galling thing than that, to them—namely, absence of orders! To my mind, the public sale system suits buyer and seller better than any other. It advertises the sellers' goods and gives the buyer the opportunity of seeing and tasting a good variety and making his choice in a way that he would'nt have by private contract. I doubt whether the enormous quantities of Indians and Ceylons which are sold in London could be handled in any other way but by public auction and if I were a broker I should certainly want more than one per cent brokerage if I had to 'worry round,' selling everything privately. With regard to offering a whole invoice privately, without the option of dividing, I should not blame the seller because in selling privately he does not know whether, if one buyer will take the leaf teas, another will take the brokens. Public auction obviates all this, as all the buyers are represented in the room and the various grades are easily divided amongst the various interests. In my opinion therefore the only system possible for dealing with the huge sales in London is that of public auction, believing as I do that in the long run it suits buyer and seller best."

PLANTING COFFEE, COCONUTS RUBBER; &c. IN THE STRAITS.

SELANGOR PLANTERS' ASSOCIATION.

ANNUAL REPORT FOR 1899

In presenting this their Seventh Annual Report, your Committee have to announce that 65 members are now on the roll of the Association, being only two less than last year, although seven names have been removed from the roll during the year through closing of estates, departure from the State and resignation. The attached statistics show an increase under cultivation of 1,172 acres, but of labourers of all nationalities a decrease of 178.

PLANTING PRODUCTS.—(a) COFFEE.—Estimates have for the most part been realized, but the depression of prices, complained of in 1898, continued during the past year, and the following list of prices realized for coffee during 1899:—viz., January $18.25, February $18.50. March $18, April $16.50, May $16.65, June $16.75, July $16, August $15.50, September $15.85, October $16, November $18, December $20.50: an average of $17.20 per picul for the twelve months—shows that there was no margin for profit; in fact, your Committee consider that the present good order of Selangor Estates is very creditable considering above prices, and that it has been a good, though trying, lesson to planters generally. During the year, until December, there was almost no demand for Liberian coffee in the European market, but since then there has been a distinct improvement.

There has also been a decided improvement in the quality of our coffee, owing, no doubt, to better machinery and greater care in curing, and your Committee hope that every member of the Association will do his utmost to help in this respect, so that still greater improvement may be reported at the end of 1900. Although some 300 acres under coffee were abandoned during the past year, it is satisfactory to know that the acreage cultivated under coffee by Europeans has not decreased, being about the same as at end of 1898, as for every acre of bad land abandoned there has been an acre of good land brought into cultivation. Mr. Heslop Hill has taken great trouble in procuring statistics which show that we can produce coffee in the Straits cheaper than it can be produced in Brazil, and this, taken with the fact that late London reports maintain that the demand has almost equalled the supply, make your Committee consider that the present outlook is more hopeful than it has been for a long time past.

(b) PARA RUBBER.—The low prices for coffee during 1899 stimulated the cultivation of this product very considerably, and no less than 1,600,000 imported and locally grown seeds were put into nurseries in Selangor, which have produced, say 1,000,000 healthy plants, all of which either have been or are being planted out. On all estates in Selangor where Para Rubber has been planted, it is doing extremely well, and, at present, it seems as if rubber was going to be one of the leading products of the State. There can be no doubt that we have much to learn about rubber, and it is satisfactory to report that through the representations of the U. P. A., F. M. S., the Federal Malay States Government have voted a sum of $4,000 in the 1900 estimates for the purpose of carrying out experiments with rubber and other products. There has also been some discussion about sending a practical man to report on Para and Castilloa Rubber in the countries where they are grown, and there is every likelihood that this will be done by the planting community even should Government not see their way to help. The planting of Para Rubber seed at stake has not, as a rule, proved a success, and even young plants are so liable to be eaten off by rats, crickets, and other pests, that the best and safest plan seems to be to plant stumps as thick as a man's forefinger, and cut long The white ants (termites) are Para Rubber's worst enemy, and your Committee hopes that any successful experiments in destroying these or any other pests will be reported to them

(c) GUTTA RAMBONG.—This rubber is indigenous to the Straits Settlements and up to the present does not seem to have received as much attention as it deserves from Planters. It grows luxuriantly and gives an enormous yield at from 10 to 12 years old (probably earlier) and no doubt the new coagulating machine will act on its milk in the same way that it does on that of the *Castilloa Elastica*, as reported in the Ceylon Botanical Gardens Reports (making it equal to the best Para). Up to last year it was rather difficult to get plants or cuttings which found a ready sale at from 15 to 25 cents each, but each plant put out for the last three years has been yielding 30 fold, and there are now thousands of rooted plants available at from 4 to 5 cents each, which is a very reasonable price. There should be about 500,000 plants available for next year, though probably not all for sale, as some planters are planting out all they can produce.

(d) CASTILLOA ELASTICA.—It has been almost impossible to procure seed of this rubber, but those plants already in the country are doing extremely well, and a large quantity of seed has been booked for 1900.

(e) COCONUTS.—A large acreage has been planted during the year, chiefly in the Coast Districts and the Kuala Selangor Oil Mill has been working steadily and turning out excellent oil and cake. The company have planted 200 acres this year. The growth of the coconut in Selangor has been pronounced by experts from Ceylon to be finer than anything in that island. This product is well worthy of attention.

(f) RAMIE.—So far, the only extensive experiments carried out with this product are those of Mr. C Baxendale on the Jugra Estate, Kuala Langat, which we hear reported on favourably and we hope soon to learn that he has proved the cultivation a success.

(g) MINOR PRODUCTS.—A very considerable area has been planted with plantains and kladi in conjunction with coffee and rubber, and both are favourably reported on as more than paying all expenses of upkeep on the land. During the year an attempt was made to establish a trade in plantains with Western Australia, but, on enquiry, the business proved to be so small that nothing came of it. We believe another effort is being made in the same direction, but have not yet heard with what result.

CINCHONA: CABLEGRAMS

AMSTERDAM, Feb. 15.

At the auctions of cinchona bark held today, over 6,000 packages were offered, of which 5,814 sold at an average unit of 10·65c per half-kilo. against 8 90c paid at the January auctions. The following were the approximate quantities purchased by the principal buyers:—English and American factories, who purchased the equivalent of 7,430 kilos. quinine sulphate; Brunswick factory, 2,629 kilos; the Mannheim and Amsterdam factories 5,201 kilos. the Frankfort-on-Maine and Stuttgart factories, 2,448 kilos; and various buyers. 3,408 kilos. The prices paid for the manufacturing bark ranged from 12c to 93c per half-kilo, and for "druggists'" from 10½c to 86c per half-kilo. The tone was very firm.—*Chemist and Druggist*, Feb. 17.

TEA: KNAVESMIRE ESTATES CO., LD.

THE ANNUAL REPORT.

Your Directors have now to submit Accounts and their Report for the year ended 31st December, 1899.

The Accounts close with a balance of R17,483 54 at credit of Profit and Loss account, and the Directors recommend that a final dividend of 2½ per cent be declared, making with the interim dividend of 2½ per cent already paid, a total of 5 per cent for the year.

The dividend will absorb R10,375, and leave a sum of R7,108·54, which it is proposed to carry forward to the new season.

The crop for the year has turned out very short, only 244,636 lb having been secured against the reduced estimate of 300,000 lb. This shortfall is almost entirely due to the very severe drought experienced at the beginning of 1899 when the Estate suffered much, and never seemed to flush freely during the remainder of the year. Following this drought, the S.W. Monsoon set in very early with strong wind and too much rain, so that no sooner had the bushes recovered from the effects of the dry weather, than they were checked again by the wind and rain; in fact there was very little good flushing weather during the whole year. Over and above these unfavorable conditions, the Superintendent was hampered by having to transport his leaf to neighbouring factories during the busiest months of the year, owing to the new factory not being completed; the transport of material for the building also taking up a good deal of labor, so that during the month of April a little leaf was lost, although nothing to account for the great shortage of crop, the greater part of which occurred during the latter six months of the year.

Expenditure per lb. of made Tea is heavy, being 26-14 cents per lb., but this is accounted for partly by the short crop, and partly by having to pay neighbouring estates to manufacture our tea, and extra transport, &c., while the new factory was in course of erection.

To cover this, however, a sum of R16,184 82 was provided by the balance due on a Loss of Profit Policy, and if this sum be deducted from the estate expenditure, the cost of production becomes reduced to 19·53 cents per lb., which is less than the tea would probably have cost under ordinary circumstances. The nett value of the crop was 35·74 cents per lb.

The Estate is in good order and well supplied with labor. The estimate of crop for 1900 is 300,000 lb. of made tea at a cost of 21·55 cents per lb., which includes the cost of opening up a new clearing of 15 acres.

The old factory which was destroyed by fire has been replaced by a larger and better building with more up-to-date machinery. The new factory is complete in every respect, and well up to the requirements of the Estate. The amount spent on the new building and machinery over and above recoveries from the Fire Insurance Company is R17,506·72, which amount has been provided for out of the revenue of the Estate.

In terms of the Articles of Association, Mr. Wm. Anderson retires by rotation from the Board of Directors, but is eligible for re-election.

The appointment of an Auditor for 1900 rests with the meeting.

TEA: THE RAYIGAM COMPANY, LD.

THE ANNUAL REPORT.

Acreage:—

RAYIGAM.

Tea in bearing	...	362 acres.
,, partial bearing	...	264 ,,
,, not in	...	69½ ,,
Forest	...	504½ ,,
Total	...	1,200 acres.

ANNANDALE.

Tea in bearing	..	250 acres.
Forest	..	8 ,,
Grass	...	38 ,,
Total	...	296 acres.

The Directors herewith submit their Report and Balance Sheet with Profit and loss accounts for 1899. After writing off R4,838·38 for depreciation on Buildings and Machinery and R1,319·12 being the balance outstanding for preliminary expenses, there remains a balance of R39,779·63 available for distribution, out of which the Directors propose to pay a 5 per cent dividend absorbing R30,000, and to place R9,000 to a reserve for making provision for the reduction of the mortgage loan, carrying forward a balance of R779·63.

The crops of tea from both estates considerably exceeded estimates, that of Rayigam being 299,398 lb. exclusive of bought leaf, and of Annandale 92,846 lb.

The net prices realised for Rayigam and Annandale Estates teas respectively were 33·82 cents and 44·22 cents per lb. The teas were all sold locally.

The estimate of crop for the current year for Rayigam is 320,000 lb. as against 250,000 lb. for last year, and for Annandale 94,000 lb., as against 82,000 for last year.

Mr. Gordon Frazer having gone on leave, Mr G E Woodman was elected a Director to fill the vacancy on the Board during Mr. Frazer's absence from the Island.

Mr. Albert Rosling retires from the Board of Directors by rotation, but being eligible offers himself for re-election.

The election of an Auditor for 1900 rests with the Meeting.

THE CLYDE TEA ESTATES COMPANY, LD.

THE ANNUAL REPORT.

Acreage:—

Tea in full bearing	..	434 acres.
Young Tea	...	112 ,,
Jungle, &c.	...	169 ,,
Total..		715 acres.

Your Directors beg to submit their Report and accounts for the year ending 31st December, 1899.

During portions of the year unusual droughts were experienced, a serious shortfall in crop resulting therefrom.

The quantity of tea made was: from estate leaf 173,040 lb. and from bought leaf 7,225 lb., against estimates of 235,000 lb and 5,000 lb. respectively.

The yield for the year equals 400 lb. of made tea per acre in full bearing.

The cost of estate tea, including transport but exclusive of manuring was R45,302·45, or say 26·18 cents per lb. The net amount realized for the total crop (180,265 lb.) was R64,402·53, an average of 35·73 cents as compared with 33·50 cents per lb. in 1898.

The expenditure on manuring during the year (R5,111·60) has been charged against revenue, and the following additional sums have been written off:—

R1,000 being balance of preliminary expenses.

R3,233·58 for depreciation in value of buildings and machinery at 2½ per cent and 10 per cent respectively.

The available balance is R7,637·09, from which the Directors recommend payment of a dividend of 2½ per cent absorbing R6,750, and leaving R887·09 to be carried forward to next account.

Under the Articles of Association, Mr. F M Laurie retires from the Board, and being eligible offers himself for re-election.

The shareholders have to appoint an auditor for 1900.

TEA: THE UDABAGE COMPANY, LD.

THE ANNUAL REPORT.

Acreage:—

215	acres in full bearing.	
84	,, 3 years old.	
36	,, 2½ ,,	
164	,, 1½ ,,	
499	acres cultivated.	
641	,, available reserve.	
1,140	acres more or less.	

The Directors beg to submit to the shareholders the accounts for the year ending 31st Dec., 1899.

The crop secured amounted to 141,430 lb. made tea against an estimate of 145,000 lb. and realized R46,599·10 or an average of 32·94 cents per lb. against an expenditure of R34,687 06 or an average f.o.b. cost of 24·52 cents per lb. The cost of production for the year has thus been reduced by nearly cents per lb. while the average price realized is better by fully 2 cents per lb.

The balance at credit of Profit and Loss Account is R5,422·77 after providing for interest on advances for extensions and development of the Company's property amounting to R11,293 34. A new factory is in course of construction, and it is expected will be fully equipped and in working order shortly.

The estimate for the current season is (including 7,500 lb. of tea from bought leaf) 165,000 lb. made tea, and it is anticipated with the increased facilities for transport from the estate and an improvement in manufacture afforded by the new factory and machinery better results may hereafter be shewn.

Mr. Gibbon in his last report dated 9th February, 1900, states that the latest clearings are making excellent progress and will be a fine sheet of tea, and that the estate is in every respect in a satisfactory condition.

Mr. Thos. Hudson retires from the Directorate in terms of the Memorandum and Articles of Association, but is eligible for re-election.

It will also be necessary to elect a Director in place of Mr. G. J. Jameson who is leaving the island temporarily.

The appointment of an Auditor rests with the meeting.

TEA AND CACAO: THE KANDYAN HILLS COMPANY, LD.

THE ANNUAL REPORT.

Acreage:—

Tea in full bearing	320 acres
„ in partial bearing	32 „
„ in planted in 1897	58 „
	410 acres
Cocoa	90 „
Reserve land	810 „
	1,310 acres

The directors have the pleasure to present their Report for the season ended 31st December, 1899, together with a statement of accounts, duly audited for the same period.

The tea crop for the year including purchased leaf amounted to 177,027 lb., the quantity secured from the estate itself being 164,945 lb. against an estimate for the season of 130,000 lb., while the cocoa crop resulted in a yield of 110 cwt. 0 qr. 4 lb., which is about 20 cwt. less than the quantity expected at the beginning of the year.

The nett price realized for the tea was 35·70 cts. against 36·23 cts. in 1898. and the cocoa sold at an average of a little over R47 per cwt. all round.

The f.o.b. cost of the tea after allowing for expenses in connection with outside leaf works out at a little over 23 cts. a lb. which shews a very large reduction on the rates of previous years, and it includes the cost of sufficient manure for a 30 acres field about to be gone over.

The profit and loss account after providing for the debit balance of last year (R6,957·76) together with interest and other charges shows a sum of R9,535·74 to credit of the account which it is proposed to deal with as follows:—

6 per cent. dividend which will absorb	R7,500 00
Carried forward to next account	2,035 74
	R9,535 74

The financial position of the Company has been placed on a satisfactory footing by the issue of debentures to the value of R50,000, carrying interest at seven per cent. per annum, all of which were subscribed for by the shareholders.

The new season's estimates are based on a crop of 160,000 lb. of tea and 130 cwt. of cocoa, besides which there will again be some transactions in outside leaf.

The expenditure including the cost of manuring 100 acres of tea is computed at an f.o.b. rate of a little over 26 cts. a lb., and the cocoa crop works out at R29 per cwt.

The capital outlay in connection with the new season is estimated at R17,790, and provides for a Pelton Wheel installation which has been rendered necessary by the continued scarcity of fuel. It further includes the cost of a new sirocco and finishing off the extension to the factory, besides opening of, and planting with tea, another 25 acres of the reserve land. The balance of the money raised on debentures will be available for these improvements to the property.

Mr. J. N. Campbell retires by rotation and is eligible for re-election. Mr. G. J. Jameson, who was elected in place of Mr. Macindoe on his leaving for England also retires, and it will be necessary to elect a director in his place.

The appointment of an auditor rests with the meeting.

TEA: THE KIRKLEES ESTATE CO., LTD.

THE ANNUAL REPORT.

Acreage 31st December, 1899:—

Tea in full bearing ..	310 acres.
Tea in partial bearing ..	70 „
Tea not in bearing ..	48 „
New clearings about ..	10 „
Timber and cardamoms, about	105 „
Uncultivated land ..	174 „
Total	717 acres.

The directors have now to submit to the shareholders the accounts of the Company for the past year.

The crops secured were 130,888 lb. Tea, 1,251 lb. cardamoms and 35 22-32 bushels coffee, while 7,809 lb. Tea were manufactured from purchased leaf. The price realized for the tea was 39 80 cents nett per lb. as against 39 33 cents in 1898, while the cardamoms sold for Re. 1·49 per lb. nett, as against Re. 1·62 per lb. in 1898.

After making ample provision for depreciation of buildings and machinery and setting aside a sum of R1,500 as a further provision to cover any possible loss of Coast advances, the profits for the past year amounted to R8,590·48, to which falls to be added the balance of R1,481·84 brought forward from 1898, less R8·10 realized short of the estimated value of cardamoms belonging to that year's crop.

An interim dividend of 3 per cent was paid on the 28th August last, and the directors now recommend the payment of a final dividend of 6 per cent. making 9 per cent for the year, and that the balance of R1,067·22 be carried forward to the current season's account.

The crops for the current year are estimated at 150,000 lb. tea and 2,000 lb. cardamoms, on an expenditure of R44,286·59.

In accordance with the articles of Association an issue of 350 cumulative preference shares of R100 each was offered to the shareholders by the directors in their circular dated 26th October last. but only 47 shares were applied for. The directors have however been able to place elsewhere 200 shares, and have decided not to issue the balance at present as negociations for the purchase of Beckington Estate have in the meantime fallen through. Payment has now been made for these shares and the loan of R25 000, appearing in the annexed accounts, was paid off on the 13 h February.

In terms of the articles of Association Mr. G. H. Alston retires from the office of director, but is eligible for re-election.

The appointment of an auditor for the current year will rest with the meeting.

CEYLON HILLS TEA ESTATES CO., LTD.

THE ANNUAL REPORT.

The Directors have now to submit their fourth annual report and the accounts of the Company for the year ended 31st December, 1899.

The crop secured was 425,603 lb. as against 389,649 lb. in 1898, and the cost of putting it on the market was 31·68, realising 36·36 per lb., as against 33·04 and 33·90 cents respectively in 1898.

While the yield was again short of expectations, it is satisfactory to notice an increase of 36,000 lb. over 1898, and the Directors would emphasize the fact that the hope expressed in last year's report, that the ground lost in 1898 would be recovered in the following twelve months, has thus happily been fulfilled to an appreciable extent, and this in the face of continued abnormal and adverse conditions.

The estimate for the current year is put down at 468,500 lb. made Tea, and Mr. Galton, when sending in his January report, says that prospects for the first six months of the year are extremely good.

Debenture interest has been paid for the half year ended 30th September, 1899, and the next payment will be due on March 31st next.

It will be noticed that the debit balance of R9,962·99 as on 31st December, 1898, has been reduced to R2,417·11 during the last year, the profit made in 1899 having thus been R7,545·88.

Mr. Galton reports in January that estates and buildings are in a generally satisfactory condition, but that labour is not so plentiful as he would like, though he hopes to get fresh labourers from the coast in March-April. Coast advances stand at R11,888·65 on 31st December, 1899, as against R16,913·67 the year before.

The Directors have decided to again relinquish their fees, and the Agents and Secretaries have agreed to respond with a like amount.

It will be noticed that the Company's form of accounts has been altered in so far as the amount written off for depreciation is concerned, the original cost of factories, buildings and Machinery being shown on the one side and the total amount written off for depreciation on the other.

In terms of the articles of association Mr. F Liesching retires from the office of Director, but is eligible for re-election.

The appointment of an Auditor for the current year will rest with the meeting.

WAREHOUSE CHARGES FOR TEA.

If the London dock and warehouse-keepers think that the slight concession recently made in regard to their charges on tea will satisfy tea growers and importers they are under a false impression. A slight reduction is better than nothing, but in this instance it can only be regarded as a foretaste of further reform in the same direction. Feeling on the subject is strong, and the position is aptly described in the following comments which we take from the *Investors' Review* of February 10th :—

The writer in the *Review* says : "The 'ring' of warehouses known as the Tea Clearing House has informed the Indian Tea Association that the committee of the Clearing House have 'decided to recommend a reduction in the bulking and taring charges, and this recommendation has been duly confirmed. As near as possible the reduction appears to be some 25 per cent., the charge for bulking and taring packages of 90lb. to 129 lb—the average weight—being now 1s 1d. per package as against 1s 5d. in former days. To have obtained a concession at all is equivalent to an admission that the agitation on the part of tea importers was well founded ; but no one should imagine that the grace now bestowed will meet the needs of the case. Indeed, it is really very little in the nature of a concession, for it has been made rather with a view to meet new conditions produced by the events which followed the 'draft' dispute. The effects of that disastrous dispute still hang over the tea market, with the result that the dealers demand that every package of tea that has been re-bulked in London shall be tared. The cost of this operation was so great that the warehouses have met the market by reducing these charges. Apart from this matter, the abatements now granted will not weaken the agitation, because many of the energetic companies will obtain no benefit from it. A company that has paid particular attention to the bulking of its tea in India or Ceylon, and has so arranged it stares that an average tare will always suffice for the buyer, does not require to undergo this combined bulking and taring charge. This is the move now made, merely a little inducement offered to the companies to go back to the old slovenly ways, when such matters as bulking and equality of tares were ignored. We therefore imagine that the committee of the Indian and Ceylon Tea Association which is sitting upon this matter of warehouse charges will not be content with such a small crumb dropped from the rich table of the warehouse-keepers, but will press for a substantial reduction in all important charges, particularly the working charge and the rent. Independent testimony has satisfied all those connected with the tea industry that a reduction in the charges is reasonable and equitable, and if such concessions are not granted responsible men in the trade are quite prepared to carry on the struggle to the bitter end. The warehouse-keepers had therefore better agree to an amicable adjustment of the points in dispute whilst there is time, for if no redress is granted, the subsequent action of those interested in a reduction would cause a far greater decline in rates than is even hinted at now."

There are also some comments written in a similar strain in the *Produce Markets Review* of the same date.—*H. and C. Mail*, Feb. 16.

THE LONDON COCOA MARKET.

(*By Harold Hamel Smith.*)

London, E.C., 16th Feb., 1900.

In spite of the Government being in the market this week, prices, generally speaking of cocoa went easier, though to what extent it is puzzling to know as the reports vary in a somewhat remarkable degree. Some say Trinidads and Ceylons are steady, and others that they are down 2s to 3s. The truth is, as I think you will see by the prices I quote below, that of Trinidads the best marks were decidedly steady, but "middling" and "good middling" red sold at lower rates compared to 81s 6d and 82s for some "Belle Fleurs" sold last month. It is this class of Trinidads that went low this week say at 78s and 79s. As to Ceylons, except perhaps for the better qualities which seemed to be in less demand, and hence met with rather poor competition, the prices realised I think compare favorably with those of the previous week, and if it still sold at somewhat irregular prices, it was with an upward tendency this time instead of a downward one.

7,908 bags of all growths were offered at Tuesday's sale, of which some 4,000 bags sold, or about one-half. Trinidads sold up to 84s 6d for fine marks say Sta Rosa Scheult at 83s and San Jose Degannes at 84s 6d whilst "good middling" and "good red" as "Las Hermanas"

sold down to 78s. Grenadas went 1s lower, and in some cases perhaps even a little more, for only two lots sold at 72s, the bulk of the "fine red" which had been selling at 72s to 74s, only realising 70s to 71s. This week the Government did not buy any Gre adas, but were purchasers of about 700 bags of Trinidads at prices varying from 79s to 81s 6d. Of Ceylons nearly 2,000 bags were offered of which 731 bags were sold, at 60s to 63s 6d for "smalls," 78s to 83s fair to good red, 85s 6d to 87s for fine red. Native cocoa sold at 66s for common and 67s to 70s 6d for fair to good. The demand for this growth is evidently dull this week for I have not heard of any more having been sold since the sale, but I still think "very fine bold" red with a light break, would fetch a fancy price.

Cocoa butter is quoted a little higher in price being 1s 5¾d today.

Stocks still run very low, the stock of all growths being only 74,943 bags against 91,152 bags last year, and 113,918 bags in 1898, of these 7,400 late Ceylons, 15,172 Trinidads, 9,727 Granadas and 25,241 bags Guayaquil.

From all accounts I am of opinion that this year's supply of Cocoa, will be nearly as large as that of 1899. The Guayaquil crop may not be quite so heavy, but the small difference will be more than compensated by increased receipts from Africa, and perhaps Bahia, especially African where I hear the increased cultivations are beginning to tell up. This is just as well for with the consumption increasing as it is we shall want every pound of last year's supply, if, indeed, it will be sufficient to prevent prices a little later, going higher.

PADDY CULTIVATION: ITS COST AND PROFIT.

LARGE PROFITS?

(FROM A WYNAAD POINT OF VIEW.)

In view of the decline in values of coffee and tea in the European markets, as well as of the circumstance that a considerable extent of land suited to the profitable growth of rice is to be found in proximity to blocks which are under coffee and tea in India, it will be instructive to glance at the advantages resulting from utilizing such blocks for raising an article of consumption which lends itself so readily as a means of supporting the labour engaged, not merely on the tilth itself but in that devoted to the major products named above.

There are practically two methods by which rice, *i. e.*, paddy can be succesfully grown, namely, through indigenous labour, and by means of imported coolies. The former are accustomed as a general rule in South India, to be remunerated in kind, a man receiving for a full day's work approximately 4 lb. of paddy, a woman 3 lb., while one anna in cash is disbursed weekly to such of the former as may have worked for not less than six days in the week; and twice a year all bands expect to be presented with a couple of large coarsely woven white cloths, on the recurring anniversary of the two principal festivals, in March-April and in August-September. On the other hand, imported coolies are paid at the rate of 4 and 2½ as each daily.

It may be taken for granted, speaking broadly, that the average value of paddy in Southern India is R2 per maund of 82 lb., and upon this hypothesis the scale of wages payable to the imported labourer, (4 as per man) is more than double that earned by his indigenous confrère.

In framing an estimate of the outlay connected with paddy cultivation, it will consequently be fairest to strike an average, and debit the account with day labour at an all round scale of 3as. per diem.

Before scrutinizing the cost of cultivating paddy lands or bhil tracts it should be assumed that the ryot possesses upon a 30 acre block a herd of at least 40 buffaloes, the accruing manure from which will suffice to liberally fertilize the whole, once every second year (one-half of the holding being so treated annually), while the services of the animals are utilized (1) for ploughing, and (2) for threshing, *i.e.*, for treading out the grain.

Paddy, on the average, requires about four months to mature, but upon some tracts, two harvests can be annually raised. The following statement furnishes a schedule of the outlay incidental to cultivating 30 acres of wet land for a period of about eight months:—

		R
1	Herding 40 buffaloes at 6 annas per diem	90
2	Cost of 30 maunds of seed grain ..	60
3	Ploughing each acre six times (prior to seed sowing) a man taking three days to do the work each time, also labour for "bunding" the land ...	200
4	Sowing the seed	30
5	Application of manure	15
6	Reaping	30
7	Threshing and winnowing the grain ..	30
		455
	Value of Harvest representing a yield of 15 maunds per acre, amounting to 450 mds. at R2	900
	Value of straw	100
		1,000
	Deduct Expenditure	455
	Balance of profit	545

The yield of paddy varies considerably and ranges from 10 to 30 fold, but in this statement a return of only 15 fold is provided for, a result which may confidently be anticipated where the work of supervision is intrusted to capable hands.

From these figures it will be obvious that on ordinary land of the extent named properly manured and otherwise treated a return of 15 fold yielding a net profit of over 115 per cent. accrues, or deducting the pay of a native supervisor, 100 per cent. profit remains to the cultivator.

One maund of paddy properly cleaned and winnowed yields about 50 lb. of raw rice, the value of the latter as a marketable commodity being governed by the particular class of grain from which it was raised.

But assuming that an average is struck between the best quality and the commonest description of rice, a rupee purchases about 18 lb. of the latter, so that a rateable yield of 15 maunds per acre is equivalent to a crop of more than 750 lb. of rice worth R41-10-8.

These calculations are based on practical experience and may be thoroughly relied on as a moderate estimate of the probable profits acruing from the cultivation of paddy or holdings at an elevation of 2,400 feet above sea level and enjoying an annual rainfall approximating 80-120 inches, fairly well distributed. RYOT.

—*Planter*, February 24.

BRITISH NEW GUINEA.

AN AUSTRALIAN CEYLON.—This is the term applied to New Guinea by the Australians. The new colony, we learn, is at last to be thrown open to white colonisation, not through the agency of a British syndicate, but by the direct action of Government Administrator, Mr. Le Hunte, with the concurrence of the Australian colonies concerned. The terms on which land may be acquired after a certain date for settlement purposes have been issued, and it is prob-

able that the career of British New Guinea as an Australasian colony will commence simultaneously with the proclamation of the Australian commonwealth. The new colony, it is claimed, possesses many of the features on which the prosperity of Ceylon is based, and offers many advantages to the semi-tropical agriculturist, the general character of the climate being not unlike that of Northern Queensland. When British New Guinea became part of the British Empire, European settlement other than at a few points of the coasts could not be attempted with safety on account of the savage character of the natives, who naturally regarded the white man as an intruder. But like the Maoris of New Zealand and the inhabitants of Fiji, they are a singularly intelligent people, and, under the kindly yet firm rule of Sir William Macgregor and his successor, have learned to respect and confide in the sway of the white man. There is not the slightest risk incurred by a settler, unless he disregards official advice and seeks to penetrate the yet unexplored portions of the colony. The country is exceedingly mountainous, and as the more elevated regions become more and more accessible they will afford a ready means of escape from the summer heat of the low lying country. So far as can be ascertained, the country is one immense forest, abounding in valuable timber, and broken in places by vast alluvial plains, formed by the deposits of rivers in flood. The natives are mostly of settled habits, haviog large villages kept scrupulously clean. The native manufacturing industries include pottery and rope making, but the Papuans are an imitative race, and speedily acquire a knowledge of the use of tools and the simpler industrial arts. The Government of British New Guinea has for some time been engaged in securing places suitable for the beginning of European settlement, a large portion being bought from the natives. Each locality has the natural makings of a plantation —good soil, a plentiful supply of water, and accessibility from the coast. Each lot will be sold at a nominal price, subject to conditions intended to prevent its being secured for purposes of speculation. At present it looks as if gold-mining, sugar-growing, and cattle-raising are destined to become the leading local industries, but there are many branches of semi-tropical agriculture which can be successfully introduced, especially tea, coffee, and rice. Several varieties of sugar-cane indigenous to the colony are said to be disease-proof, while the ease with which luxuriant crops of bananas, yams, coconuts, mangoes, sweet potatoes, and other agricultural products are obtained by the natives fully illustrates the capabilities of the soil. There is a Customs tariff imposed, with numerous exemptions, for revenue purposes, but at present the whole of the New Guinea trade is in the hands of Queensland firms. As the development of the infant colony proceeds the Solomon and other island groups will inevitably become more or less influenced.—*H. & C. Mail*, Feb. 16.

COCOS-KEELING ISLANDS.

ALL-BRITISH CABLE MAY BE LANDED ON ONE OF THE GROUP.

The fairyland in the Indian Ocean, which is known as the Cocos-Keeling Islands, and belongs to a Scottish chieftain of the name of Ross, third monarch of the name, is suddenly assuming quite a new importance in the world.

The Cocos-Keelings are coral islands of the south-west coast of Java, which Clunies Ross the first found unoccupied three-quarters of a century ago, and colonised with a few Scots and some coolies. According to a Colonial Office report issued on Saturday the islands shipped away last year 800 tons of copra, the produce of four and a half million coconuts at £14 15s. a ton.

There are 615 people on the islands, and a school with two pupils—"rather above the average attendance," remarks the Commissioner; but the younger generation of the Ross family are taught English two hours daily by Miss May Ross. There are no police, and there is no need for them. The natives seemed to the consul more like the laboring class of Europeans bereft of alcoholic liquors and released from the struggle for existence than like natives without religious restraint.

They build good European boats under the instruction of the Ross dynasty, and they do not undervalue themselves. They are surprised, indeed, why the British Government does not give them men-of-war to build.

The home of this simple little community is likely to become a part in the "all-British cable" scheme viâ the Indian Ocean to Australia. The cables at present pass through Java, which is Dutch; but the Eastern Extension Australasia and China Telegraph Company proposes to land a cable on one of the Cocos Islands. The Commissioner, who is very enthusiastic about the scheme, says Mr. Ross, is prepared to grant the concession. He adds, urging the connection of the Far East by an Indian Ocean rather than a Pacific cable: India would be connected by an all-British cable. Then, taking an even more ambitious view of the possibilities of the case, he adds: It is probable that even without a subsidy a cable connecting Zanzibar with India, Australia, and Java, by way of Seychelles, Chagos, Cocos, and Christmas Islands, would become a commercial success if worked in conjunction with the African Trans-Continental line. If the tariff from Europe to Zanzibar was 1s. 3d. the rate to India might be lowered to 2s. 3d.—*Morning Leader*, Feb. 15.

MINERAL PHOSPHATES WANTED IN AUSTRALIA.—The Government of South Australia offers a reward for the discovery of payable deposits of mineral phosphates. The amount is £500 if found on Crown lands, and £250 if on private property. The discoverer will be entitled to a lease of 21 years of 648 acres of land. The conditions are that the deposits are readily accessible by rail or port; that the deposit is sufficiently abundant, and is available to the farmers at a payable price; and that the product is of good, marketable quality, averaging not less than 40 per cent of phosphate of lime. Half the amount will be paid when 200 tons have been produced, and the remainder when the second 200 tons have been produced.—*Melbourne Leader*.

CAMPHOR is an infallible remedy for chicken lice. When you make your nest and put in your eggs, at the same time place in the nest with the eggs, one camphorated ball, which is sufficient for the entire incubation, and your hen and little chicks will leave the nest free from all kinds of vermin. When you have placed the little ball in the nest, you need not bother any more. It will evaporate and get to be very small toward the latter part of the incubating, but never mind, it has done its work. It is a good idea to keep one of the balls in the nest where the hens lay, as it keeps them from having scaly legs as well as keeping them free from vermin. The camphorated ball is a little white ball and can be had from almost any drug store. I buy penny squares in Kingston, instead of the ball, and half a one is effective in the layers' nests.—*Journal of the Jamaica Agricultural Society*.

THE SEYCHELLES.

The Acting Administrator's report on the Blue Book for the year 1898 has just been published by the Colonial Office. Mr Brown's report shows a satisfactory state of affairs, the revenue having been the largest ever collected in Seychelles, and in excess of the expenditure by R39,791. The exports, less coin and bullion, amounted to R1,278 382, and the imports, less coin and bullion, to R889,041. The large increase in both exports and imports is due to the large vanilla crops of 1897 and 1898. Vanilla valued at R748,810 was exported in 1890.—*Commercial Intelligence*, Feb. 17.

THE BANK CLEARING-HOUSE" AND LOCAL BUSINESS.

The figures we append show an enormous increase in the mass of local business during the past fifteen years :—

		R.			R.
1885-86	...	51,740,748	1890-91	...	83,607,049
1886-87	...	55,530,720	1891-92	...	98,358,939
1887-88	...	64,921,478	1892-93	...	105,914,810
1888-89	...	74,072,097	1893-94	...	128,112,905
1889-90	...	76,791,733	1894-95	...	133,812,072

		R.
1895-96	...	171,677,240
1896-97	...	171,429,740
1897-98	...	192,136,477
1898-99	...	169,991,275
1899-00	...	195,467,028

Since the "clearing house" was established, we have had the means of obtaining reliable statistics which indicate the steady revival of business and prosperity, mainly through the rise of the tea industry. Still, it would never do to attribute all the increase in the clearing-house figures to the growth of local trade. True, the value of our imports and exports show much improvement in the interval, as may be seen from the following comparison (the figures for 1898 being the latest published):—

	Imports.	Exports.
1885	R 45,132,340	R 35,782,400
1898	97,893,058	85,372,622
Increase	R52,760,718	R49,590,222

The increase here is also very notable; but at the same time a good deal of allowance must be made for the gradual change in the modes of business in Colombo. Far more cheques are used by natives and planters now than in "days of old.' Chetties and planters were notorious for dealing almost universally in rupees—and of course a great deal is done still in payment of coolies—whereas now cheques are readily accepted by the carpenter or other artificer, the cart contractor, rice-dealer, &c., &c. In 1885, we were slowly emerging from a period of great depression; the old Oriental Bank had collapsed the year before and its successor had by no means secured general confidence. Now we have five first-class Banks all doing a large business and all therefore contributing handsomely to the sum-total of the "clearing-house."

VISIT OF A JAVA PLANTER TO CEYLON.

We have had a call from Mr. Bley, a planter in the Samarang division of Java, and who has been out there for the past 22 years without ever visiting Europe. Mr, Bley has had a great variety of experience in his day, as a Sugar, Coffee, Tea, Liberian Coffee, Cacao, Nutmeg, Pepper, Kapok and Cinchona planter. Now he confines his attention chiefly to Liberian coffee with some Arabian, and cinchona with tea. Mr. Bley has enjoyed a fortnight in Ceylon very much, more especially in visiting Kandy, Peradeniya. Galaha, Mariawatte, Dimbula, Nuwara Eliya, Ragalla, and Bandarawela. Mr Bley would at once describe Nuwara Eliya as the remains of an old volcanic crater, so like is it to many such spots in Java. He finds that the cost of labour in Ceylon is a little more than he pays in Samarang, where, however, nearly all is done by piecework. Mr. Bley states that he is troubled with a bad disease in his cacao in Java, which he has nowhere seen in Ceylon. It has not yet been scientifically described. Mr. Bley left for Europe last month by the N.D.L.S. "Kœnigin Luise": we wish him a pleasant trip and visit and that he may return re-invigorated. Mr. Bley confirms our opinion that the people of Holland and adjacent Germany are beginning to drink tea very freely. Java, he thinks, will never become a great tea-growing country.

THE BRITISH ASSOCIATION.

The Report of the British Association for the Session of 1899 held at Dover reached us by a recent mail. It is a bulky volume of well-nigh 1,000 pages, besides lists of members, &c., and, of course, contains the latest in "Science." The only plan or plate is the "plan of Dover Harbour" as prepared to accompany their. paper by Messrs. Coode. Son & Matthews. This bears considerable resemblance to the Colombo Harbour with two openings—one of 800 and the other of 600 feet. The area of the Admiralty division is 610 acres at low water; of the Commercial harbour 75 acres —together 685 against 640 acres for the Colombo harbour.—After the present "Notes on Ceylon Botany" are done, it will be interesting to reproduce "A sketch of the History of Indian Botany" by Sir George King, in our *Tropical Agriculturist.* Mr. Parkins' paper on Rubber, given in our Manual, is summarized; as also briefly "Notes on Indiarubber" by R.H. Biffen, Cambridge, and this summary we give as follows:—

Notes on Indiarubber, by R. H. Biffen, *Cambridge.*

Starch and caoutchouc appear not to occur together. Caoutchouc occurs as small particles in latex, and coagulation begins with their running together. Certain reagents will bring this about; but it is better to avoid all chemical processes, any of which do harm. Two physical processes are now being used. (1) The latex, mixed with water, is strained and churned; the thick cream which rises to the surface is pressed through rollers and converted into rubber. (2) The author's process consists in separating the rubber with a entrifugal apparatus. Details are given in the paper regarding the chemical properties of the different kinds of rubber obtained from *Hevea, Castilloa, Manihot, Ficus, Hancornia, Kickxia, Artocarpus*, and *Clusia*. The author also raises some questions of theoretical interest with regard to possible relations between caoutchouc, starch, and resin-bodies, and indicates lines for further inquiry.

CINCHONA AND QUININE.

These important staples are again in an interesting position, few knowing exactly what their immediate future on the market will be, and, opportunely, Messrs. C. M. & C. Woodhouse, the Mincing Lane cinchona-brokers, have issued a pink circular about them this week. After reviewing the markets during 1899, and tracing the market fluctuations month by month, they give reasons for the quite unlooked-for results which occurred last year. They say:—

In the first place, the rise in quinine caused the markets of Europe and the United States to be swept for supplies, and dealers, &c., were induced to part with their stocks to take advantage of the higher prices obtainable in London, with the consequence that the stocks in London have been increased by about 1,000,000 oz. This is, however, an operation that cannot well be repeated, and the trade everywhere must be proportionately bare of stocks. On the other hand, we might have expected the rise in prices to have checked the consumption to some extent; but, as far as consumption can be gauged from the exports of quinine, &c., from Germany, this does not appear at all to have been the case, but rather the contrary, for 210,900 kilos. (7,381,500 oz.) were shipped, against 200,900 kilos. (7,031,500 oz.) for 1898. Again, it was natural to anticipate that a unit value of about 11c. per half-kilo. would have induced the planters in Java and elsewhere to take advantage of the rise and hurry their bark to market, and thus the total supplies of bark would have shown a large increase over previous years; but this has not been so, as the total exports from the principal producing countries show no increase, even allowing for the quantity manufactured in Java and exported in the form of quinine. Further, the returns of the Java bark offered at auction in Holland show that there is a much larger proportion of succirubra and other barks of low analysis as compared with previous years.

The three main facts to be adduced from the above statement are (1) that less bark was shipped from Java last year (5,583,400 kilos, against 6,945,400 kilos in 1898); (2) that the exports of quinine from Germany increased by 381,500 oz.; (3) that there is an increase of 997,000 oz. in the London stock of quinine. In regard to the future of cinchona, Messrs. Woodhouse quote from Mr. Standen's report made after his visit to Java, and his opinion confirms their views that "consumption has at last overtaken production." The circular concludes with statistics of Java bark, and a three-years' summary of imports and exports of bark for United Kingdom and Holland, from which readers are left to draw their own conclusions. This year has opened with a very firm market for cinchona, and the tendency, both in London and Amsterdam, is towards higher prices. The London stock of bark is the smallest since 1894—viz., 16,099 packages; on the other hand, Amsterdam has a larger stock—viz., 14,387 packages, against 12,263 packages last year. Ceylon and British India are now sending us greatly reduced quantities, the imports last year being—Ceylon, 618,921 lb., against 975,784 lb., and British India, 2,000,000 lb., against 3,090,000 lb. So far this year there have been no shipments at all from Ceylon, and Java has sent but little—615,000 Amsterdam lb. for January. Another consideration is that the first Amsterdam auctions this year were small, as also was the one held on Thursday, so that another advance in the unit is extremely probable. This Messrs. Woodhouse surmise.

Since the beginning of the year quinine has been in a strong position, and all indications point to a still higher market in the future. There have already been three advances on the part of makers, from 1s 3½d to 1s 6d without engagement, the latest advance being made on Tuesday, when the makers of B. & S. and Brunswick, quinine added 1d. This advance, coming as it does immediately before the Amsterdam auctions, has puzzled the second-hand holders, but it is entirely due to the good consumptive demand and abundance of orders. The second-hand market has also been fairly active, the bulk of the transactions being for March delivery, commencing at 1s 3⅞d in January, and rising to 1s 5¾d, which figure has been paid this week for March delivery. The quinine-auctions to be held in Java on February 28 are expected to influence the market, and if they are successful the shipments of bark to Europe are bound to diminish, for Java's idea is to make and export quinine, and ultimately to keep all the bark they can.

We have confirmation of what we have said regarding the decreased output of cinchona in India in an important circular which we have received this week from Mr. J. E. O'Connor, Director General of Statistics, Calcutta. This shows that, during the thirteen years ending 1898-99, the area under cinchona in India has fallen from 14,491 acres to 7,591 acres. At the end of the last official year, of the 7,591 acres of land under cultivation, nearly 82 per cent was situated in Southern India, the remainder being in Bengal; the latter comprising 1,373 acres in and near Darjeeling. Most of the area in Southern India is in the Nilgiris (4,531 acres), and there are 1,173 acres in Travancore, and smaller areas in Mysore, Malabar, and Coorg. In Bengal, the cinchona plantations, which are the property of the State, cover 1,303 acres. In the Madras Presidency, on the other hand, the industry is mainly in private hands, the State plantations covering only 874 acres. There has been a substantial decline in Bengal as well as in Madras, and in Coorg the cultivation has been almost entirely abandoned. The number of trees in permanent plantations has fallen in the same period from 28⅓ millions to about six millions, of which a little over four millions were classed as mature. Mr. O'Connor attributes the decline in cultivation to a fall in the price of quinine. He gives statistics showing the amount of bark collected and exported from Southern India (Madras and Bengal) from 1885-86 to 1898-99. For the past five years they were:—

		Bark Collected.	Exports (lb).
1894 95	...	2,027,629	1,737,318
1895 96	...	2,039,881	939,938
1896 97	...	1,491,506	321,478
1897-98	...	1,692 439	3,056,769
1898-99	...	997,001	1,361,539

The Bengal and Madras Medical Departments use between them at least 1,200,000 lb. of bark per year for the manufacture of alkaloids and galenical preparations, and are purchasers from private planters. These Departments are a factor in the cinchona-problem which is not generally reckoned with. The figures which we give indicate that they use about a twelfth of the world's present output of bark, which is reckoned at 16,000,000 lb., or 3,000,000 lb. less than a decade since. The fact should be specially noted that the Indian Government has come into the open market as a buyer; not for much—still, a buyer.—*Chemist and Druggist*, Feb. 17.

PLANTING NOTES.

SUGAR IN QUEENSLAND.—The report of Mr. Maxwell, a Honolulu sugar expert, deals comprehensively with the three districts of Bundaberg, Mackay, and Cairns. He thinks that the climatic conditions largely favour the industry in Queensland, particularly in maximum rainfall occuring during the hot weather, but speaks strongly of soil exhaustion in various portions of the colony. He also deals with the ratoon question, and considers continued growth without replanting conducive to many pests and diseases. He regards many portions of each district as suitable for irrigation, and condemns the system of extreme maceration in the manufacture of sugar. Three experimental stations should, he says be established—one in the Cairns district, one in Mackay, and the third at Bundaberg, the last named to be the chief experimental station.—*Sydney Mail*, Feb. 17.

WANTED: A LOCAL TEA STANDARD.—We have had the red-leaf tea sample sent us some days ago on our table; but it remains quite "sweet"—although very "coarse" ("a coorse kintra piece of wark") and the Brokers assure us the infusion was sweet and wholesome in this case: *but* that there are far worse teas sold sometimes in the local market and that "Merchant" and his colleagues (as members of the Tea Traders' Association) should make it their special duty to form and establish a "standard" below which no teas should be admitted into local sales or for export shipments.

"DO AWAY WITH THE BROKERS."—We omitted giving our correspondent, who is responsible for this "counsel of perfection," some of the reasons which render action in that direction very undesirable at the present time. It is well-known that leading broking houses act as great checks on the large blending houses in their buying of tea. The brokers take the trouble to distribute many samples in independent directions and before the sales they are the recipients of very numerous orders to buy, which often act as a great check on the big dealers, not allowing them their own way, but rather provoking a free and active competition.

BOTANICAL DISCOVERIES.—The "Colonial Garden" established at Vincennes last July is already, says the *Morning Post*, rendering important services to the French Colonies. M. Dybowsky, the director, informed an interviewer that he was at present engaged in studying the ko-sam plant, which had been found to be a marvellous remedy against the dysentery prevalent in hot countries. A discovery made at the garden was that the *eucomia alm'ides* contains 28 per cent. of gutta-percha. Plants have been sent to Tonquin, Annam, and North Africa, and it is confidently hoped that very important results will be attained. Incidentally M Dybowsky found that the bark of indiarubber trees contains 5 per cent. more rubber than the leaves and branches. All the Governors of the French rubber producing Colonies have been informed of the fact. The bark has hitherto been thrown away.—*British and Colonial Druggist*, Feb. 9.

ROYAL TREES.—In the vicinity of Frogmore there is a large number of ornamental trees scattered about the well-kept lawns. Amongst these are a Salisburia adiantifolia, planted by Princess Victoria Eugenie and Prince Maurice of Battenberg on the Queen's eightieth birthday; a deciduous Cypress, about 85 feet high; Retinospora obtusa aurea, planted by the Empress Eugenie, March 5. 1880; Tsuga Pattoniana, planted by the Queen of Denmark on December 1, 1875, about 13 feet high; Abies lasiocarpa (concolor?), planted by Princess Thyra of Denmark on December 1, 1875; Abies Nordmanniana, planted by H.R.H. the Duches of Edinburgh on March 11, 1874; Cupressus Lambertiana, planted by the Prince of Wales on March 24, 1864; Thuya gigantea, planted by H.R.H. Princess Louise of Hesse on July 1, 1864; another of the same kind, on the opposite side of the path, 55 feet high; another Maidenhair Tree (Salisburia adiantifolia), planted in 1754; Thuya gigantea, planted by H.S.H. Princess Hohenlohe on March 16, 1857. Close to the mausoleum is a practically good-looking deciduous Cypress, and a fine Cedrus Deodara and C. atlantica. *English Arboricultural Transactions, vol. iv., part 2, p.* 207,

SUGAR FROM THE ALOE.—The *Kolar Goldfield News* says the famine-stricken people in India, in 1877, were seen to dig out the core of the aloe and boil it for consumption as food. The product was found to be exceedingly sweet, and the question is asked whether the aloe plant could not be used as a source of sugar. A gentleman is said to be buying land to the extent of 2,000 acres in the Kolar district for growing aloes.—*British and Colonial Druggist*, Feb. 16.

"OIL OF CHINESE (AND JAPANESE) WOOD" is extracted from the grains of a tree called *Aleurites cordata*, or in Chinese *Ying tzu tung*, which grows in rocky places, especially in the provinces of Hunan, Hupeh and Szechuen. The oil is used for making lacquer and waterproof oilcloths. It can be employed instead of linseed oil in painting, but for this purpose, according to the *Farben Zeitung*, it should first be boiled with a little oxide of zinc, minium or litharge, the temperature being kept over 200° Centigrade.—*British and Colonial Druggist*, Feb. 16.

LABOUR AND EXCHANGE IN INDIA AND CEYLON.—We direct attention to the incisive letter which we publish elsewhere from Mr. R. H. Elliot, of Mysore. The writer takes a gloomy view of the planters' future, more especially from the belief that "exchange" will be further forced up: but this, we can scarcely believe,—nor can we at all think that there would be the least hope of obtaining bounties in the planters' interests. But Mr. Elliot's writings are always suggestive and well worth reading.

CAUCASUS TEA.—According to a British Consular Report the tea grown in the Caucasus is inferior in quality and flavour to the Indian, Ceylon and Chinese teas; and the prices obtained have not been encouraging. There is great difficulty in procuring labour, and the expenses connected with tea planting are so high as to render profits dubious, especially in competition with Indian and Ceylon teas. And for the present at any rate, if the Consular Report can be relied on, Indian planters should feel re-assured about danger from the Caucasus. However the Russian Government, as stated in *Capital* of 1st instant, is undertaking experiments in tea cultivation in the Caucasus, and is offering favourable conditions to those embarking on it: and perhaps in time the situation may be changed for the better.—A. K.

PLANTING IN THE STRAITS.—COFFEE, RUBBER AND COCONUTS:—The annual report of the Selangor Planters' Association—the greater portion of which we reproduce on page 671—is a most instructive document and puts the position of our neighbours in the Straits in a very clear light. Altogether the 70 estates represented have 15,537 acres in cultivation, the crop estimated for 1900 (we suppose of coffee) being 25,636 piculs, and the labour return shewing 2,877 Tamils, 401 Chinese, 1,016 Malays and Javanese. Much useful work has been done by the body, of which Mr. W W Bailey is Chairman and Mr. Tom Gibson Secretary. besides what appears in our quotation; and we can only extend all good wishes to our brethren at the Straits, and say how pleased we are to see the Veteran pioneer Mr. T H Hill still to the fore.

TO ALL PARTS OF ASIA, AFRICA, AMERICA AND OCEANIA.

Seeds & Plants of Commercial Products.

Castilloa Elastica Cervantes.—Orders being booked for the coming crop of seeds available in March and April, selected seed from very old trees. R. N. Lyne, Esq., Director of Agriculture, Zanzibar, writes under date 24th August, 1899:—"Please send me 200 seeds of Castilloa Elastica for further trial; the seeds of Castilloa you sent me last August germinated very well." Price and particulars in our Circular No. 32; special quotations for large orders according to quantity; immediate booking necessary to avoid disappointment.

Hybridised Maragogipe Coffee.—A larged-beaned superior variety of Coffee in demand; orders booked for the coming crop of seeds, February and March delivery. Price according to quantity on application.

Hevea Brasiliensis (Para Rubber).—Orders being booked for the coming crop available in August and September, 1900. This is the only crop of seeds in the year. All orders should reach us before the end of July to avoid disappointment, as we have to make arrangements in time; guaranteed to arrive in good order at destination. We have already booked a large number of orders. A Sumatra Planter writes, dating 9th March, 1899:—"I consent to the price of £——per thousand. I herewith order 50,000 upon condition that you guarantee at least 33 % seeds germinating." Plants can be forwarded all the year round in Wardian cases. Price and particulars as per our Circular No. 30. A Borneo planter writes dating, Sandakan, 17th August, 1899:—"The last lot of Para seeds turned out very well."

Ficus Elastica (Assam and Java Rubber.)—Seeds supplied by the pound with instructions; price according to quantity. This tree grows equally well in high and low land, in forest and grass land, its cultivation being extended largely by the Indian Government. For price of seeds with particulars as per our Circular No. 33.

Manihot Glaziovii (Ceara or Manicoba Rubber).—Fresh seeds available all the year round; price as per our Circular No. 31. It is superior to Mangabeira rubber and second to Para rubber.

Urceola Esculenta (Burma Rubber) and **Landolphia Kirkii** (Mozambique Rubber).—Seeds and plants, both are creepers.

Cinchona *Seeds.*—Different varieties.

Sterculia Acuminata.—(Kolanut). Superior quality, seeds and plants; price on application, packed to stand the transit well for several months, a hardy tree, cultivation easy.

Erythrina Lithosperma.—Thornless variety, new crops of seeds ready in December, May and June. Price according to quantity on application.

Seeds and Plants of Cinnamon, Nutmeg, Clove, Sandlewood, Pepper, Cardamom, Vanilla, Arabian, Liberian and Maragogipe Coffee, Cacao, Tea, Coca, Fibre, Medicinal and Fruit Trees. Shade and Timber Trees, Eucalyptus various varieties, also Palms, Bulbs, Orchids, &c.

Our enlarged Descriptive Price List of Tropical Seeds and Plants of Commercial Products for Foreign Countries for 1899-1900 are now being forwarded to applicants in different parts of the world. Also Descriptive Price Lists of Seeds and Plants of Fruit Trees, Bulbs, Tubers and Yams, and Orchids.

"SOUTH AFRICA."—The great authority on South African affairs of 25th March, 1899, says:—"An interesting Catalogue reaches us from the East. It is issued by William Brothers, Tropical Seed Merchants, of Henaratgoda, Ceylon, and schedules all the useful and beautiful plants which will thrive in tropical and semi-tropical regions. We fancy Messrs. Williams should do good business, for now that the great Powers have grabbed all the waste places of the earth, they must turn to and prove that they were worth the grabbing. We recommend the great Powers and Concessionaries under them to go to William Brothers."

A leading Planter writes from *New Hebrides* under date 17th January, 1899:—"I shall like a few more of your Catalogues to distribute through these Islands, as I feel sure many would place themselves in communication with you, did they know where to write for Seeds and Plants."

Our New Descriptive Price Lists of Seeds of Shade Trees for Coffee, Cacao, Tea, Cardamoms, &c., Timber Trees, Trees for Avenues, Hedges Wind and Shelter Belts, Ornamental Trees, Shrubs and Climbing Plants; and Seeds and Plants of Palms, Calamus, Pandanus, Cycads, Tree and other Ferns, Crotons and Dracinas, now being prepared and will be ready shortly.

Agents in London:—MESSRS. P. W. WOOLLEY & Co., 33, Basinghall Street.

Agent in Colombo, Ceylon:—E. B. CREASY, Esq.

Telegraphic Address:
WILLIAM, VEYANGODA, CEYLON.
Lieber's, A.I. and A.B.C. Codes used.

J. P. WILLIAM & BROTHERS,
Tropical Seed Merchants,
HENARATGODA, CEYLON.

"A FARMER'S EVERY DAY LIFE."

"A Farmer's Every Day Life"—is the title of "Cosmopolite's" latest contribution to our columns, given below. It is written at our special request and we know few men so able to do justice to the theme owing to a very wide experience, keenness of observation, and facility of expression, not to speak of the saving grace of humour which is so often visible. As a former Australian and New Zealand pioneer and bushman, an ex-Colombo merchant and still more, as an ex-Rangala planter, before taking to farming in Aberdeenshire, it must be seen that "Cosmopolite" has travelled over a wide field and that the conclusions he now lays before us cannot have been formed in haste, but are the mature results of much experience and observation. Practically the question discussed is that of a country *versus* a town life, and it is one that must come home very closely to planters in Ceylon, who may be intending shortly to seek retirement in the United Kingdom, or may be looking forward to such a consummation at no distant date. It must be extremely difficult after an active planter's life out here to settle down in town or suburbs with nothing, but a few hundred square yards of garden of one's own to traverse or overlook. "Logie" (Sir Græme Elphinstone) felt it so badly, albeit his residence was in the country, that he returned once more to "planting" and is now in the Malayan peninsula. Others who have gone "home" to settle down, have been very glad to get back to Ceylon on any terms, that is to secure a charge if possible; and if not to make a home on their own account. Now "Cosmopolite" comes forward and preaches that the proper course for the retired planter is to follow his example and become a farmer. Of the healthfulness of the life there can be no denial, and really that ought to count for an immense deal if there be children and a full household to think of. But, in our experience, gentlemen farmers—practical and hard-working as any Ceylon planters let us say—in Ross-shire and Morayshire, always grumble unless they can show a handsome percentage of profit on capital laid aside every year, without making proper allowance for the extremely healthful life enjoyed, or even for the economy in education and other items experienced, as compared with the colonist who has to see his family broken up and separated. Still, it cannot be denied that there are cases where even practical farmers have not been able to make both ends meet; where, indeed, they have had to dispose of their farming interest to prevent the disappearance of their capital altogether. We have two or three ex-Ceylon planters—hard-headed Scots even—who have come within this category,—men who like "Cosmopolite" would any day prefer

To hear the lark sing
To the mouse cheep,

—to live and work in the country, rather than be shut up in town or suburb and dawdle between their city brokers or agents and their club—an extremely disagreeable life surely to a man in the full vigour of life and who is willing to be useful in his day and generation. But how are such men to be recommended to take to "farming" if it cannot be shown to "pay"—not in the sense of the 8-or-10-per-cent.-profit-sharers; but to the extent of covering actual annual outlay and household expenses? Now, we trust "Cosmopolite" is going on in the further instalments of his Paper, with practical advice calculated to help Ceylon planters who may wish to follow his footsteps, to enable them to choose the right sort of farm to stock it properly and to choose suitable subordinates and to shew, generally, how to make "a fair start." Perhaps, too, we may have successful "farmers" in England, Wales, the South of Scotland and even Ireland (all e -Ceylon planters we mean) who may supplement "Cosmopolite"'s letters with specimens of their own experience and then, to finish up, we must endeavour to get contributions from a planter-settler in Tasmania, New Zealand, New South Wales or Victoria, the United States or Canada, and why not in South Africa? In this way "Cosmopolite," who is capable of criticising all such productions, will have started us on the way to much information of a varied and useful if not valuable character. A "Tea-farmer"'s life in Ceylon can scarcely be considered a permanency in the vast majority of districts, and especially if there be a family. "What should come next" is therefore a matter of much practical interest at all times, and we trust "Cosmopolite" and other retired Ceylon men will help us to answer it.

A FARMER'S EVERY DAY LIFE.

IN NORTH BRITAIN:—No. I.

(By Cosmopolite.)

Surprise has often been expressed that so many retired planters, merchants and civil servants from the East take, on their return to the mother country, to the glorious, most ancient but (by the British Government) most neglected profession of farming. With regard to planters one can see some reason in this choice: because having been accustomed to an out-of-door existence, they pine for a continuance of that same; but in the case of the others, it surely must be a matter of heredity—derived by them from the blood of their great ancestor, the original farmer Adam.

As a rule these amateur farmers, transported from the palm-fringed isle of the Eastern wave, or the banks of the Ganges, do not prove exceptionally successful in their new walk of life; but to a certain extent they seem satisfied with the healthy occupation they have undertaken, and do not complain more grievously than do professional farmers who have from infancy upwards grumbled as only a British farmer is entitled to grumble.

But having met many of these late-in-life agriculturists, I have been much distressed to find that they fail to see the humours of a farmer's life which blend with the numerous troubles and trials which beset these labourers in the corn field; and I have often felt inclined to draw attention to some of those amusing incidents which I, for one, cannot avoid seeing in my every-day life, and which

adds so much to the pleasure of living in this beautiful world of ours.

It is just 40 years since I began

A FARMER'S CAREER

and, although for a time, I took up the rôle first of Colombo merchant, and then that of a Rangala planter, the time came when I once more returned to my old love, —my old profession, - in the wilds of Buchan, where the East wind blows its best, and the cattle, sheep and turnips are unequalled in the world.

I know that the *Observer* is read regularly by farmers from our Eastern Empire, and also, of course, by planters who are still in the land of sunshine and tom-toms, but who intend at some future time, to adopt a farmer's life in the old country and in the hope that these notes of mine may catch their eyes, I intend giving some plain facts from a farmer's, life in Scotland, as seen by one who knows life in the East as well as in our Australian Colonies, and I trust that some of those who can see nothing but drudgery in a farmer's life may learn from my experiences that there is much of pleasure and amusement even in a bucolic existence which one can easily assimilate, if not a perpetual victim to those gloomy views which generally accompany a disordered state of the liver. And now having made these remarks by preface, let me commence a description of that life which I am leading, hoping my remarks may be of some interest to those Ceylon men now farming at home, and to those planters who, in the near future, intend to beat their paper umbrellas into scythes, and their pruning knives into sheep-shears.

There are many, especially of late years, who have given up country life and gravitated to the towns, giving as their reason for so doing that the life they had been leading was so deadly dull compared with the pleasant and joyful existence to be had in the cities.

But there is another side of the question which these renegades from the country seem to have overlooked, and I am just the one that can point it out to them, for I have lived 20 years in various cities in different parts of the world, and spent nearly twice as long a period in country districts, at home and abroad. With such practical experience to guide me I have come to the conclusion that

THE ENJOYMENTS OF A TOWN LIFE

are but small in comparison with the disagreeable irksomeness of civilization. To say nothing about the smells, noises, bad water, indifferent gas and a score of other unpleasant peculiarities of city life, there is the chronic state of ill-health in the children of the town, and the normal condition of ill-nature peculiar to all housekeepers. If a city man is detained later than usual at his club, or some other important place of resort, the look which he receives from his wife on his arrival at home, not to speak of her language, distinctly shows an active state of that lady's liver. If he is half an hour late for dinner, he is greeted with the question: "How do you expect servants to stay if you can't come home in proper time?" Exciting passages of that sort would never do with me; I would promptly go on strike. What is a paltry half hour to me, who was once three days' late for my dinner, and then had to eat it raw, as I could get no fire lighted, owing to everything being soaking wet with rain!

No, no, the pleasures of town life are as Dead Sea fruit—so sweet and delicious to the eye, so bitter and nauseous to the taste. My own school fellows, that I meet, who have spent their whole lives in a city, seem to me to have been dead from their birth, whilst those who have been resident in the country appear to have been very much alive all the time townsfolk never get any exercise worth calling by that name, for what they have consists principally in driving their own trap, or riding on the top of a fiery, untameable tram-car. But ask the planters of Ceylon or the farmers of Britain how they account for their exceptionally good health, and they will reply that it is all owing to

THE WALKING

they have to do; for walking helps the general tone and improves the temper. People with thick boots, and the sense to wear them, generally have even tempers. There is nothing like walking ill-temper off; never mind what sort the weather is, go out and half tire yourself, and then hang up your water-proof and you will find yourself in a calm, forgiving mood unknown to people who stick in the house. Don't think I am mad: "Allah created the English mad"—but not the Scotch, and I have walked a good many tens-of-thousand of miles in my day, and know what I am writing about. Of course, we have much to growl about, farmers always have. If we have not got too much rain we have got too little, and if the rain comes just as we would wish it to, instead of being thankful for present mercies, we cast our prophetic eye into the future and declare that there will be a drought or a deluge next month. Farmers can never see a blight prospect, they are not built that way, and gloom and despondency are their portion. Of course, there are exceptions to every rule, and I claim to be one of the exceptions to this, for I do not go about the country with my jaw hanging below the lowest button of my waistcoat, as I remember some planters doing, in the days when coffee leaf-disease was rampant. And I know other farmers also who are quite content with things as they are, although, naturally, we would prefer better prices and a more generous Government, and these are the sort of agriculturists I would recommend farmers from the East to copy.

There are some people, however, who are never content—for example, a neighbour, who had been present at a very intellectual lecture which was given in our village, lately; when I asked him if he had not enjoyed and felt edified by it, replied:—"Weel I dinna ken that, but twa days' rain wid hae deen us a hauntle mair guid."

It has been asserted that the gloom and despondency, which is inherent in most farmers, is caused by the

BAD WHISKY

they drink. Not that they drink much, they cannot afford to do so, but there may be some truth in the assertion, for the whisky which is retailed to the farmers at markets and fairs, and which I have sampled, seemed to me to be a deadly poison, and went down my throat like a torchlight procession. Of course, I know that the average farmer is ill to please, and we had an example of this, only lately, in our own county. Lord Aberdeen, one of the most generous landlords in the kingdom, erected a magnificent fountain, in the village of Tarves, for the benefit of his tenantry; but these, instead of being grateful, assembled in a body, and pelted the unoffending fountain with stones. Doubtless had his lordship laid on whisky to the fountain, instead of *aqua pura*, his tenantry would have exhibited rather different feelings than they did.

In this, the month of February, how pleasant it is to sit at

ONE'S "AIN FIRESIDE,"

listening to the howling of the wind in the chimney, and watching the snow flakes covering up trees and hedges, and lying twelve inches deep all over the face of the country, and to know that everything on the farm is secure, the stock housed and comfortable, and enough of turnips pitted and straw thrashed to last through a two-months' storm at any rate. I know that all Buchan farmers cannot be in this equable frame of mind, because there are some men who will never learn a lesson, but will continue year after year the unprofitable occupation of digging under the snow for turnips, which are, after all, injurious as food to the health of their stock, and the pulling of which is injurious to the temper of their men. For my part, with 100 loads of turnips pitted in the month of November, as I make a point of doing, I feel comfortable and ready for any emergency.

The heavy snowstorm, which has been raging for the past ten days, will do a lot of good, as it will clear the atmosphere of the wicked microbes of influenza, hooping cough, measles, &c. which have been rampant in all the towns and villages; whilst in the country it has put a stop to the epidemic of ploughing-matches which has been prevailing during the past two months.

THE CHAMPION PLOUGHING MATCH

of the district was held in a field adjoining my farm, when 42 ploughmen with their teams faced the music. Of course I graced the field with my presence, in spite of a perfect deluge of rain, which, however, seemed to create no inconvenience to the performers, who continued to plough away, without either coats or waist coats, and doing most excellent work in spite of wind and wet.

One of the judges impressed me very much with the thorough manner in which he performed his duties, bending down and examining every "furr," and calculating the depth, breadth and the levelness with the greatest care. Strange to say he was not an agriculturist but a tailor by trade, from a neighbouring village; dressed like a ship's cook in his shore togs, or a south sea missionary in uneasy circumstances, and his attitude, at times, reminded me of the Sphinx crouching in the desert; composed, intense, repressed in manner; whilst, every now and again, from his statuesque throat there proceeded a hoarse cough,—and little wonder, considering the drenching nature of the day. It was a stirring scene, and fully 1,000 spectators were present from near and far; for the day of the Champion Ploughing match is one of the red-letter days of the district, and one on which the farm hands all get a holiday.

At some ploughing matches I have heard bitter complaints from the competitors against the heat and brightness of the day, these declaring that they were "blin' fu' wi' sun." But no complaints of that kind were to be heard on this occasion

Dog-fanciers who were on the ground had a rich treat in the sight of an animal that appeared to me to be half terrier—the other half no breed at all—just dog. I have seen a similar breed of dog in those kennels of Oodispattu from which the

RANGALLA BOYS.

were wont to draw fresh couples for hunting the wily *mozel*. Report said that the Committee allowed this rare specimen of the canine race into the field, as a special attraction, without any payment whatever.

Had I been an artist I would have immortalised the scene, giving prominence in my picture to the Sphinx-like judge and the cross-bred dog.

CHINA TEA.

THE exports of China tea, in the season just closed, show a considerable increase, more especially to Europe and Russia in Asia:—

CHINA TEA—CLOSING OF SEASON.

The Season being finished, this is the final Circular. The total Export as per Customs Returns is:—

	1899-1900.	1898-99.	1897-98.	1896-97.
	lbs.	lbs.	lbs.	lbs.
Europe	*16,174,605	†12,976,578	‡12,607,188	12,994,298
Australia and New Zealand	6,094,660	5,818,934	4,447,217	6,208,357
United States & Canada	9,629,601	9,158,280	7,740,345	12,142,286
South Africa	1,223,245	1,417,703	1,257,944	2,577,719
Coast Southward	3,604,686	3,437,405	3,473,286	4,864,182
Coast Northward	7,421,853	5,910,040	6,361,542	13,720,934
	lbs.	lbs.	lbs.	lbs.
	44,148,650	38,718,940	35,887,522	52,507,776

* 1899-1900 including 604,300 lbs. Brick Tea.
† 1898-1899 ,, 294,044 ,, ,,
‡ 1896-1897 ,, 278,000 ,, ,,

"AN AUSTRALIAN CEYLON" is the latest title for New Guinea, just as "New Ceylon" was for North Borneo. With Australian capital and backbone so near, British New Guinea should go ahead rapidly under a liberal régime.

NEW TROUT-FISHERIES.

The following extracts from a paper in *Blackwood* for February (by John Bickerdyke) will be read with interest by many in Ceylon where so much is done to introduce Trout into our streams :—

At a time when agricultural land is in many places unproductive of income, while trout-fisheries, more particularly those in the neighbourhood of big towns, will fetch enormous rents, the utilisation of ponds, lakes, and streams as fisheries is well worthy of consideration by all land-owners who have water of any kind on their estates. There is a popular belief—like many others, a mistaken one—that trout cannot be reared except in running water. As a matter of fact, there is hardly any piece of unpolluted water, stagnant or flowing, in which trout may not be raised, provided the fish can obtain, either in the water itself or from the hands of the keeper, a sufficient supply of food.

But while a stagnant pool may be made a rearing-ground for large, lusty trout, it should be well understood that for these trout to naturally increase their species running water is necessary. This fact, however, need be no obstacle in the way of trout-culture; for where the fish in any pool cannot increase naturally, it is an inexpensive and simple matter to keep restocking the water from other sources.

In many large lakes trout, salmon, pike, perch, and eels live together on fairly amicable terms, each taking toll of the other, with the result that while trout are not plentiful, they are, on the other hand, very large and, as a rule, in splendid condition. There is, however, one great disadvantage in having trout with coarse fish in the water—the trout do not rise well. They may be taken by trolling all through the season, but if they rise at all, it is only when the may-fly, or green-drake as it is called in Ireland, brings them to the surface.

Exactly the same state of affairs may be found in rivers where coarse fish abound. The greater the number of coarse fish, the larger the trout, and the fewer the opportunities of the fly-fisher. These facts point very strongly, and indeed unmistakably, to the necessity for abolishing coarse fish from those rivers and lakes in which it is desired to have free-rising trout.

I would like here incidentally to comment on the mistake so many fly-fishermen make of returning to the water what they term out-of-condition trout. When black-looking, lanky fish of a foot or so in length are caught, particularly if about the middle of May is passed, the best thing to do is to knock them on the head, for they will surely be old or diseased, and are better out of the river.

In addition to taking out the coarse fish, the shallows of the stream should be harrowed and made as clean as possible—a process which may be repeated with advantage every summer. If there are any lay-bys where black, stinking mud has collected, the filth should be altogether removed and spread on the land. It makes excellent manure. Light-coloured, clean, sandy mud, on the other hand, harbours the larvæ of waterflies and other fish food, and should not be wantonly disturbed. Large reed beds, as I have said, are better put out of the way, for they are cover for pike. I do not mean by this the wholesale cutting down or sweeping away of all rushes, reeds, sedge, and weeds. A reasonable quantity of these growths is necessary to serve both as shelter for the trout and breeding and resting-places for the thousand-and-one small creatures on which the trout feed.

As trout, after they are introduced, will be found spawning in the autumn and winter, great care should be taken to leave the bed of the river, and the mud at its sides, carefully alone during that season. Nothing is more fatal to the healthy hatching of the eggs than disturbance of any kind, or the dirtying of the water, caused so often by men wading in the river, netting, dredging, and similar operations. I have not the least doubt that works and repairs carried on at mills during the spawning season entail the loss of thousands of prospective trout. The sediment in the dirty water sent down settles on the redds (gravelly shallows where the trout have been spawning) and chokes the eggs. A trout egg is a most delicate thing. It may be said to breathe in the water, being full of tiny pores from which carbonic acid gas is given off. If these pores are choked with the sediment deposited from the stream, the embryo within the egg is asphyxiated by its own carbonic acid gas which it is no longer able to get rid of. For this reason a trout-egg so near hatching that the eyes of the young fish can be seen, if placed in still water, will die in a few hours, the water immediately next to it quickly becoming charged with poisonous carbonic acid gas. The owner of a trout-stream should therefore use his utmost endeavours to maintain the purity and flow of the water during the spawning season. Once the fish are hatched and feeding, the sediment, and even a certain amount of sewage pollution, matters little. Indeed, in sewage-polluted rivers trout often thrive exceedingly, though they are unable to breed; and of this the Wandle, near London, is a remarkable instance.

Ponds and lakes into which no water flows are as useless for breeding fish as a polluted river; but such sheets of water may be treated in much the same way as the stream. In the first place, the coarse fish should be removed. Next, if the bottom is muddy and capable of being cleaned, the cleaning should be done, except in places where it is desirable to cultivate weeds, and with them the food of trout. When the water is ready for them trout should be turned in from time to time.

The sheets of water not included in the terms "river" and "stream," which are likely to yield the best results, are those which have naturally a gravelly bottom, with aquatic growths near the edges, and here and there rocks; and, secondly, pools which are capable of being emptied. These latter are mostly of artificial construction, and, as a rule, have been brought into existence, at some time or another, by means of a dam thrown across the course of some small stream, the object often being to obtain water-power. Even though the bottom be of mud, trout will thrive; but it is most desirable to occasionally draw off the water, dry the pond, and expose it to the air for a few months. The fish-culturists of Catholic times, when there were no means of transit for sea fish, and fastdays had to be provided for, used to grow a crop on the bottom of their ponds from time to time. The earthy bottom having been sweetened and purified by light and air, water was turned in, and fish introduced. The example is one to be followed.

Sheets of water which I should deem entirely unsuitable for trout are those which are very shallow, and in which the temperature rises considerably in hot weather. If there is a stream flowing through such a piece of water, and a considerable growth of weeds among which the trout can take shelter from the sun, then fish may thrive; but be it well understood that trout must have shelter, either under overhanging banks, in deep water, under weeds, among rocks, or behind old camp-sheathing. The reason why so many amateurs fails in their attempt to rear trout-fry is that they place them in quite shallow ponds of small area, exposed to the full light of the sun—ponds in which the temperature of the water varies considerably and quickly.

Lastly, I come to a consideration of the varieties of trout which may be introduced. This depends in a large measure on the locality and the food-supply, natural or artificial. In Sir Thomas Wardle's famous pool in Staffordshire an immense quantity of trout of various kinds are kept in a healthy condition in a pool of probably not more than an acre in extent. The growth of weeds is considerable, and the supply of water-snails, shrimps, and other natural food seems almost unlimited; but in addition the keeper throws in half a bucket or so of fish food every day, which is readily taken by the rainbows, fontinalis, Loch Leven trout, farios, and hybrids inhabiting the pool.

I have no hesitation in saying that for ponds and other enclosed waters, where the temperature in winter is not a very low one, there is no variety of trout so excellent as the rainbow (*Salmo irideus*

variety *Shasta*). These fish grow extremely fast; they are most beautiful in appearance; they fight and play as gamely as a sea-trout, and on the table they are far superior to *Salmo fario*, our own brown trout, or yellow trout, as it is called in Scotland.

What would be the result generally of placing rainbow-trout in rivers is not known, the experiment has not been tried in any river on a sufficiently large scale to test the suitability of the fish for unenclosed waters. It is feared that they would migrate and be lost, as was the case with the fontinalis. But from an experiment tried in the Dove, it seems that the fish in such a stream have remained until the third year of their age; and their continuance in the beautiful Derbyshire river seems probable, provided there is a sufficient quantity of food for them, and the water does not at any time get too cold. It may be taken as an axiom that fish which grow large quickly, eat greedily. To put such fish (among which rainbows may be classed) into a stream containing little food is decidedly a mistake. They are sure to disappear, not necessarily in consequence of migratory tendencies, but merely in search of food. A few rainbows have, so I understand, been placed in the Test, and many have been caught.

Having stocked our stream, loch, or pond, the question of preservation has to be seriously considered.

Last year Sir Herbert Maxwell was largely responsible for a bill introduced by Lord Balfour of Burleigh on behalf of the Government, in the House of Lords, where it passed its third reading. According to its provisions trout would have been protected from anglers and netsmen between October 15 in one year and February 28 in the year following, both dates inclusive. To sell or expose trout for sale between these dates would also have been an offence. I most earnestly beg all who value the sport of trout-fishing to support this measure, which will surely lead to a better stock of trout and improved sport for all classes of anglers.

THE CEYLON LORIS OR SLOTH.

PHOTOGRAPHED IN FIVE ATTITUDES—AWAKE AND ASLEEP.

We have received from Mr. W L H Skeen one of the most interesting set of photographs it has ever been our fortune to gaze upon. They are illustrations of the habits of that strangest of Ceylon animals, the "loris." Mr. Skeen had considerable difficulty in taking the shy little creature so often; but he managed to get five successful representations within four to five hours of different positions, and these shew (1) the loris in full activity climbing a tree with his owl-like face and bright protruding eyes most keenly observant; (2) loris resting between two branches, but still "wide-awake"; (3) loris in same attitude, but dropping off to sleep; (4) loris fast asleep—and doubled up; (5) loris sleeping in a suspended attitude. We can imagine how the heart of Frank Buckland or any similarly enthusiastic naturalist would be charmed with Mr. Skeen's most faithful and most interesting reproductions. Tennent has two fair engravings in his "Natural History"; and this is what he says of the "loris" (specimens of which we have seen occasionally hawked round Colombo for sale):—

The only other quadrumanous animal found in Ceylon is the little loris,* which, from its sluggish movements, nocturnal habits, and consequent inaction during the day, has acquired the name of the "Ceylon Sloth." There are two varieties in the island; one of the ordinary fulvous brown; and another larger, whose fur is entirely black. A specimen of the former was sent to me from Chilaw, on the western coast, and lived for some time at Colombo, feeding on rice, fruit, and vegetables. It was partial to ants and other insects, and was always eager for milk or the bone of a fowl. The naturally slow motion of its limbs enables the loris to approach its prey so stealthily that it seizes birds before they can be alarmed by its presence. The natives assert that it has been known to strangle the pea-fowl at night, to feast on the brain. During the day the one which I kept was usually asleep in the strange position represented on the last page; its perch firmly grasped with both hands, its back curved into a ball of soft fur, and its head hidden deep between its legs. The singularly-large and intense eyes of the loris have attracted the attention of the Singhalese, who capture the creature for the purpose of extracting them as charms and love-potions, and this they are said to effect by holding the little animal to the fire till its eyeballs burst. Its Tamil name is *thavangu*, or "thin-bodied;" and hence a deformed child or an emaciated person has acquired in the Tamil districts the same epithet. The light-coloured variety of the loris in Ceylon has a spot on its forehead, somewhat resembling the *namam*, or mark worn by the worshippers of Vishnu; and, from this peculiarity, it is distinguished as the *Nama-thavangu*.

* Loris gracilis, *Geof.*

CINCHONA: IN SOUTH AMERICAN FORESTS.

BY J. M. VARGAS-VERGARA, F.C.S., ETC.

(Abstract of a Paper read before the London Section of the Society of Chemical Industry, on Jan. 8.)

The recent rise in the price of cinchona bark has led to hopes that South America might again compete with India and Java. In former years, when Colombia exported cinchona, very few barks gave more than three per cent of sulphate of quinine, and fairly good samples contained 1·5 and two per cent.

The cinchona fever almost completely exhausted the Colombian forests, and trees now to be found in the woods cannot be more than twenty years old.

As the collection of the bark in bygone days was a very profitable business, samples were often mixed with all sorts of rubbish. The Quineros were not very particular as to the quality of bark, their chief aim being to obtain as many bales as possible, without any consideration as to its content of alkaloids. Hence the author is unable to determine whether there has been a favourable change in the constitution of the bark, or whether the increase in the yield of quinine is due to the extra care with which the extraction is now made. The following are some of his figures:—

		Quinine.	Quinine Sulphate.
Tuna (Doa), wild	...	4·20	5·72
Cuprea (Bucaramanga), wild		2·26	3·00
Ledgeriana trunk, cultivated		4·08	5·57
Do twigs	do.	0·85	1·17
Succirubra trunk	do.	4·91	6·70
Do. twigs	do.	3·87	5·27
Ledgeriana (old)	do.	4·78	6·53
Do. (new)	do.	4·86	6·63

The Colombian barks from the cold Andes are, according to Mr. Vergara, much richer in quinine than in the olden times, and the cinchonidine has almost disappeared from these barks.

The ledger, old and new, presents a curious fact, the old is the same bark as the new, but has been kept under unfavourable conditions, being exposed to the rain, wind and sun during some years, so that the owners thought this bark had become completely useless. However, on analysing it proved equal to the freshly gathered bark.—*B. and C. Druggist.*

THE TONACOMBE ESTATES COMPANY OF CEYLON, LTD.

THE ANNUAL REPORT.

The acreage of the Company's Estates is as follows:—

Tea in bearing ...	... 494	acres	
Tea not in bearing	... 96	"	
Tea seed bearers	... 3	"	acres.
			593
Cardamoms in bearing ..	87	"	
" not in bearing ...	14	"	101
Reserved Forest	..	..	24
Fuel Trees ...	..	..	11
Chena and Patana	..	...	1,151
		Total ..	1,880

The total quantity of Tea secured during the year was 188,078 lb. which has been sold at an average of 42·74 cents per lb. net.

The total Cardamom crop was 9,791 lb. which realized R1·76 per lb. net.

The total expenditure on working account amounted to R59,407·19.

During the year the permanent improvements on capital account include the erection of a set of 12 room lines, the purchase and erection of a new Rapid Roller, and the completion of the tats on the ground floor of the new extension to the Factory.

The balance available, after providing for depreciation, amounts to R27,800·21, and the Directors propose to pay a dividend for the year at the rate of 5 per cent., absorbing R14,000, to place R13,000 to the credit of Extensions account, and to carry forward R800·21 to next account.

In pursuance of the Policy indicated by the Directors in their Report for 1898, Ten Debenture Bonds of £100 sterling each have been redeemed, the Debenture issue now standing at £6,000.

The coast advances have been still further reduced from R8,193·58 on 31st December, 1898, to R5,125·98 on 31st December, 1899.

The crops for 1900 are estimated at
200,000 lb. Tea,
9,000 lb. Cardamoms,
against an expenditure of R64,122·50.

During the year Mr. Cumberbatch and Mr. Figg resigned their seats on the Board, and Mr. R S Templer and Mr. G H Alston were appointed in their places.

Of the Directors the Hon. J N Campbell retires by rotation, but is eligible for re-election.

The appointment of an Auditor for the current year will rest with the meeting.

CEYLON GAME PROTECTION SOCIETY.

ANNUAL REPORT.

The last annual report was laid before a general meeting held at the Hill Club, Nuwara Eliya, on 7th February, 1899. Since that date three general meetings have been held, viz., on 17th May in Nuwara Eliya, on 24th May in Kandy and on 16th Sept. in Nuwara Eliya and one Sub-Committee meeting on 17th November in Nuwara Eliya. In addition to this a branch meeting was held in Nawalapitiya with the sanction of the Hon Mr. Lee, Mr. P R Shand, being the moving spirit and Mr. Bailey, late Government Agent, C.P., presiding.

The attendance at the meetings generally has been very poor, but at the last general meeting a small working Sub-Committee was elected, to discuss correspondence and though only one Sub-Committee meeting has yet been called it is clear that the work of the Society will now be pushed through in a much more satisfactory manner. In this connection I might mention that the thanks of the Society are due to the Secretary of the Hill Club for his invariable courtesy and kindness in placing a room at the disposal of the Society when appealed to by the Hon. Mr. Lee.

BUSINESS.

One of the first subjects brought up for consideration by this Society was a resolution by Mr. Gordon Reeves that this Society ask for donations from visiting sportsmen. An amendment, that Government be asked to impose a tax on visiting sportsmen, was carried, but Government would not agree to impose the tax. During the past year numerous wealthy sportsmen have visited this Island and have enjoyed good sport and the following three donations to the Ceylon Game Protection Society have been received by the Hon. Mr. Lee:—

	£	R.	c.
From Comte Antoine Kharenhuller and Hans Bechinie	5=	73	50
From Comte de Raveneau and Comte de Martin Prey		30	00
From Mr. Paul Niedeck		100	00

—making in all R203·50, so that the Society does not meet with due recognition by the wealthy sportsmen who enjoy the result of the Society's work. Some definite tax *should* be imposed on visiting sportsmen

PROTECTION OF ELEPHANTS.

The Society asked Government to prohibit the capture of elephants or to raise the license for capturing an elephant from R10 to R100.

The Government met our request half way, by raising the license to R50.

The Society also asked Government to remit the amounts received for game licenses to the Society. This, Government said, they were unable to do, but at the same time they have raised the amount allowed for watchers at the Yala Sanctuary by an additional grant of R500 per annum and are going to allow two watchers in the Nuwara Eliya district at R180 per annum each. Watchers to be chosen by the Ceylon Game Protection Society. The Society has been paying for four watchers in the Sabaragamuwa Province and for two in the Nuwara Eliya district. The four watchers in Sabaragamuwa are said by the Balangoda Ratemahatmeya, Mahawalatenne, to be doing good work. The watchers in the Nuwara Eliya district are commonly decribed as being useless, and are accused of accepting bribes, &c., but I am of opinion that there is a marked decrease in poaching and even if the watchers do accept bribes, as most low-paid natives will do, still the mere fact that they *have* to be bribed must have a deterrent effect on poaching. It is almost impossible to check the watchers' movements though the Hon. Secretary makes an effort to do so by making him produce his book for superintendents to write their names in on his visiting the jungles in the neighbourhood of their properties.

Last year this Society asked Government to prohibit the *shooting* of sambur and deer in the forests lying along the ridges in the neighbourhood of Nuwara Eliya, the Elk Plains and the Horton Plains, at an elevation of over 4,000 feet, in fact where running to the knife can be and is indulged in. His Excellency the Governor issued the necessary prohibition, but the limits of the prescribed country are not very clearly defined and the result has been that some dissatisfaction has been expressed by sportsmen living in the hill districts where no elk packs are kept. I think this matter should be represented to Government and the limits of the prescribed country clearly defined.

His Excellency at the request of the Society, has graciously given permission that recognised packs of hounds be allowed to hunt in the forest reserves, on condition that each master of a recognised pack, register his name in the office of the Assistant Conservator at Nuwara Eliya. The prohibition of the export of deer and sambur hides which lapsed on 31st December, 1899, has been extended for another five years.

I learn from the Collector of Customs that the shipments of buffalo and other hides are always carefully examined and now and then deer and sambur hides have

been discovered mixed up with the other hides and the whole shipment has been confiscated. On 8th September, 1899, the Society was courteously and considerately invited by the Hon. the Collector of Customs to inspect a shipment of deer and sambur horns about to be shipped. A few Committee members of the Ceylon Game Protection Society who were able to attend did so with very interesting results. Though the proportion of *apparently* shed to apparently "cut" *i.e.*, killed horns, was satisfactory from a game protectionist's point of view, unfortunately the Inspecting Committee were convinced that a very large proportion of the so-called shed horns were what is vulgarly called "faked" being really "cut" horns.

There is small doubt that there is a tremendous illicit slaughter of game. The number of game licenses issued in the past year were 361, of which 175 were taken out by Europeans, leaving 186 among natives. This small number is proof that the low-country Headmen do not exert themselves sufficiently to check illicit killing of game. The repeated efforts of this Society to get a reform in the Game Ordinance which would put a stop to the indiscriminate slaughter of deer and sambur in the low-country, have not been hitherto successful, chiefly due, I think, to the fact that the members themselves are not agreed as to what is the best scheme. The Sub-Committee, however, drew up a scheme and issued it in the form of a circular to the Committee members for suggestions and the replies will be laid before the general meeting and it is to be hoped that some definite scheme may be elaborated for presentation to H.E. the Governor for his approval. That a reform in the present Game Ordinance *is* necessary, is allowed by the Government Officials themselves.

The country lying between Yala River and the Kumbukan Aar was proclaimed as a sanctuary, on 22nd February, 1899. The Government Agent, Southern Province, asked the Ceylon Game Protection Society for help towards paying for extra watchers during the close season, as it was then that poaching was rife. The Ceylon Game Protection Society granted them R500; but it was gratifying to learn that Government had allowed an extra grant of R500 and our contribution was returned to us. The thanks of this Society are due to that thorough sportsman, Mr. A. F. Broun, Conservator of Forests, for looking after the sanctuary, it being in charge of the Forest Department.

It is a common idea that Government Officials, as a rule, are more or less opposed to the interests of the Society. Far from this being the case, I am glad to say that the Ceylon Game Protection Society has invariably met with the greatest courtesy and assistance whenever it has been in the power of the officials referred to to give it, and from His Excellency the Governor downwards there is a decided wish to further the Protection of Game, should a really workable scheme be laid before Government; and the object of the Society should be to formulate such a scheme.

Subscriptions and Finances:—The total number of members on the roll is 231, of these 60 have not paid their subscriptions for 1899, and of these 60, 15 have not paid for 1898. At a general meeting in Kandy, held 24th May, seventeen members being present, it was decided to raise the subscription from R5 to R10. As there were only 17 members present and as the resolution did not, of course, refer to subscriptions for the current year, the Hon. Mr. Lee took upon himself to inform members that the subscriptions for 1899 was R5 as before and received over sixty letters protesting against raising the subscriptions. At the general meeting Mr. J Wickwar is bringing forward a resolution that the subscription remain at R5. As a glance at the balance sheet will show the funds are in a satisfactory state and with the additional help of R360 for watchers in the Nuwara Eliya district, the present year should see us doing more in the low-country as it is there that illicit slaughter is quite unchecked. I annex balance-sheet, which shows a balance to credit of the Ceylon Game Protection Society of R1,857·99 exclusive of say R300 due by members.

North C. Davidson, Hon. Secretary, C.G.P.S.

BALANCE SHEET.

1899.		R	c.
28th Feb.	To balance as per balance sheet in Mercantile Bank ..	1,362	41
Do	To balance as per balance sheet in National Bank ..	53	00
Do	To balance Cash sheet ..	10	00
1900.			
28th Feb.	To Donations received during past year	203	50
Do	To Subscriptions received during past year ..	870	00
Do	To Interest allowed by Mercantile Bank	31	35
		R2,530	26
1900.			
28th Feb.	By Paid watchers ..	522	00
Do	By Printing, Advertisements, Stamps, Stationery, &c..	146	27
Do	By Bank Commission ..	4	00
Do	,, Balance in Mercantile Bank	1,776	49
De	,, do National Bank.	81	50
		R2,530	26

North C. Davidson, Hony. Secretary, C.G.P.S.
28th February, 1900.

Cocos-Keeling.—There are on the Island some magnificent specimens of *Cicsus Elastica.* The trees are about 10 years old—*British and Colonial Druggist*, Feb. 16.

Viticulture in North Ceylon.—The appended paragraph reminds us of an omission in discussing products available for our dry Northern regions. The late P. A. Dyke showed how the vine could be successfully grown on a small scale in Jaffna. Why should not the country from Anuradhapura Northwards suit it as well as Uruguay? The sooner Mr. Willis has an experimental pioneer vineyard established the better:—

The Vine in Uruguay.—From a recent report by the Uruguayan Bureau of Agriculture, we learn that in the Carelones department, in 1896-97, there were 230,200 American Vines in nurseries, and 617,800 at the end of August last. The number of Vines transplanted and growing were, for 1896-97, some 149,000, and for the year ending in August last 196,334. The amount of Grapes produced in the department increased last year to 383,530 kilogrammes—showing that the pest of the phylloxera had actually increased the production, owing to the restoration of vineyards and the augmented acreage devoted to their culture. In the department of Monte Video the plants in nurseries, in 1896-97, were 1,288,800 of the American variety, and 2,826,100 in 1899. The Vines transplanted in the former period were 262,900, and in the latter term 104,300. The smallness of the latter figure, compared with the former, is due to grafting—there having been 12,700 Vines grafted in the nurseries, and 379,782 in the vineyards. The production of Grapes in 1897-97 was 938,400 kilogrammes: for last year the production was 1,481,740 kilogrammes. It will thus be seen that the joint vineyards have improved in production, notwithstanding the plague of the vine-louse, and this improvement is due to restoration of Vines and increase in number of vineyards.

Correspondence.

To the Editor.

NOTES ON CEYLON BOTANY.

NO. III.

DEAR SIR,—Kerr was succeeded in 1816 by Mr. Alexander Moon, a zealous botanist whose ingenuity and industry did much to advance Ceylon Botany. After eight years' habitual study of the local vegetation, with but few opportunities, a scanty library, and no assistance, Moon published in 1824 his *Catalogue of Ceylon Plants*, a 4to volume containing over 900 indigenous and a number of exotic plants. This is the first book on Ceylon plants which gives specific names, the system of binominal nomenclature having been invented by Linnæus, a few years after writing his "Flora Zeylanica," which contains generic names only. Moon's Catalogue was a creditable work; it contains numerous notes of reference and a useful "Introduction to Botany," which being also ingeniously translated into Sinhalese is specially suited to local students; whilst appended is a Sinhalese Supplement, the names being arranged alphabetically in Sinhalese characters. In 1821 Mr. Moon selected the site, and formed the nucleus, of what has since become one of the most famous Gardens in the world, viz., the Royal Botanic Gardens at Peradeniya. Moon was an indefatigable botanical collector, and the magnitude of his collections may be estimated from the fact that they amounted to "ten cart-loads." Moon died in 1824 from fever, and to his memory has been dedicated, amongst others, the genus *Moonia* (now referred to under *Chrysogonum*) by Dr. Walker-Arnott. To the latter well-known botanist, though more particularly connected with the Botany of peninsular India in collaboration with Dr. Wight, must be given the credit of having elucidated many Ceylon species. In 1836 he published descriptions in Latin, of a collection of Ceylon plants made by Col. Walker, referred to below.

Although Peradeniya rapidly became the recognised centre of botanical activity, a spirit akin to botanical ardour was inspired in other quarters, and in 1824 the Ceylon Literary and Agricultural Society, the forerunner of the present Ceylon Branch of the Royal Asiatic Society, established an Experimental Garden at Fort Macdonald in Uva, which however had a short and unimportant history.

The next Superintendent of the Peradeniya Gardens was Mr. James Macrae, appointed in 1827, whose name is commemorated in *Dendrobium Macræi*. He added considerably, especially in orchids and grasses, to the herbarium collections of his predecessors, and supplied copious specimens and information to Dr. Lindley in England for his "Genera and Species of Orchidaceous Plants," an *8vo.* dated 1830-40. Following in chronological order, a name worthy of honourable mention amongst the ranks of amateur botanists in Ceylon is that of the enthusiastic collector Col. Walker, Military Secretary in Ceylon (afterwards Brigadier-General in India) from 1820 to about 1837 who with his wife, a gifted delineator and painter, made one of the most valuable collections of Ceylon plants ever got together. This collection, now believed to be in possession of the Royal Gardens at Kew, furnished the material, as already referred to, for a *4to.* volume by Dr. Walker-Arnott entitled *Pugillus Plantarum Indiæ Orientalis*, published in 1836. Mrs. Col. Walker's "Journal of an ascent to the summit of Adam's Peak" (in 1833) forms interesting reading in the *Companion to the Botanical Magazine* for 1836, Vol. I., as does also her account of an extended tour made by herself and her husband in the Southern Provinces in 1837, which is given in Vol. II. of the *Journal of Botany*, 1840.

In 1830 the Peradeniya office seems to have been again vacant, and was apparently not filled till 1832 by the appointment of Mr. J G Watson, who, being specially interested in orchids, made a dried collection of that family, discovering amongst others the ground orchid *Acanthephippium bicolor*. He however held office for only five years, and appears to have had two or three successors during the next five years.

The specific name "Championii" distinguishing several Ceylon plants, is in honour of Capt. Champion of the 95th Regiment, who was stationed here from 1838 to 1847, and afterwards killed at Inkerman in 1854. Champion made an extensive collection of indigenous plants, and was recognised as an authority on local botany, his advice and instruction being sought for and esteemed.

Mr. J W Bennett, F.L.S., Assistant Government Agent at Matara, having a taste for botanical pursuits, wrote in 1842 a *4to* volume on the *Fruits of Ceylon*; whilst in 1844 Mr. Simon Casie Chitty contributed to the literature of Ceylon Botany in the shape of a *Botanical Dictionary*, a *12mo.* intended to contain the names of all the plants of the Tamil flora, with their synonyms." X. Y.

NO. IV.

DEAR SIR,—The gradual increase to the herbarium at Peradeniya and consequently to new species, had in the course of 10 or 12 years, rendered Mr. Moon's Catalogue out of date, and the want of a revised edition was felt. Dr. Wight, the celebrated Indian botanist, and author of the voluminous *Icones Plantarum*, &c., when on a visit to Ceylon in 1836 undertook at the suggestion of Governor Sir R. W. Horton to supply this want. Accordingly all the material available at Peradeniya was duly despatched to him in India. The work could not have been deputed to better hands; but these—however, unfortunately for Ceylon—proved to be already too full, and the large quantities of dried plants were returned to Ceylon after an absence of eight years, without the object in view having been accomplished. To assist in the execution of this undertaking, Dr. George Gardner, shortly after his appointment in 1844 as Superintendent of the Peradeniya Gardens, was sent over to India to join Dr. Wight at Coimbatore, where he remained for a few months. Under the *ægis* of Dr. Gardner, who had already made himself famous by his explorations in Brazil and elsewhere, the history of Ceylon Botany may be said to have entered on a new era of activity. Gardner soon proceeded to travel all over Ceylon, collecting and describing native plants—and publishing the novelties—chiefly in the Calcutta "Journal of Naturel History," for the botanical editorship of which he was principally responsible. His enthusiasm as a collector may be judged from the fact that whilst recruiting health for a month on the Nilgiris he collected and dried about a thousand species on his "own account." Gardner's energetic career was, however, cut short by an apoplectic fit at Nuwara Eliya in March 1849, four years after his arrival in the island.

As powerful patrons of the cause of Botany—the grammar to successful Horticulture and Agriculture—the genera *Anstrutheria, Carria,* and *Mackenzia* (Strobilanthes) are worthy of reference, since they commemorate respectively Mr. Philip Anstruther, late Colonial Secretary of Ceylon ; Sir W. O. Carr, F.L.S., late Chief Justice; and Rt. Hon. J. A. Stewart-Mackenzie, Governor of Ceylon from 1837-1841, who himself made an impartant collection of Ceylon plants which he afterwards presented to the Kew Herbarium.

Succeeding Dr. Gardner in 1850, Dr. G H K Thwaites, F.R.S., arrived in Ceylon early in that year to take up the duties of the post which he worthily and uninterruptedly held for over 30 years, never having once left the island after his first arrival, so great was his devotion to his work. Thwaites had an early and special love for cryptogamic botany, which in Ceylon he soon extended to the phanerogamic flora. In 1858 was commenced the publication of his *Enumeratio Plantarum Zeylanicæ,* which was completed in an 8*vo.* volume in 1864. The cause of economic botany also found in him a strong promoter, and during his administration the branch garden at Hakgala was founded in 1860, and that at Heneratgoda in 1876, each with the object of introducing and experimenting with products suitable for the respective districts represented; whilst one must also attribute to him in a great measure the establishment of cinchona cultivation in the island, the introduction of both the Para-rubber and Ceara-rubber tree, and of Liberian coffee. The genus of Algæ *Thwaitesia* was dedicated to him, and this was supplementd in 1867 by the foundation by Sir Joseph Hooker of the beautiful epiphytic genus *Kendricka,* representing the third of Thwaites' names.

Dr. Thwaites was elected F. R. S. in 1864, and made C. M. G. in 1878. He died suddenly in Kandy in 1882, two years after his retirement, and a handsome cenotaph memorial was erected to him in 1885, in a prominent part of Peradeniya Gardens, by public subscription, a similar recognition of services having already been accorded to the memory of his predecessor Dr. Gardner, in the form of a cenotaph in the Gardens. There is a memoir of Dr. Thwaites, with portrait, in the *Tropical Agriculturist* Vol. XIV, and a short notice of the life and death of Dr. Gardner in the "Journal of Botany" for 1849.

Succeeding Mr. Hartog, who held for three years (1874-77) the newly created office of Assistant Director at Peradeniya. Mr. (now Dr.) Daniel Morris, who is at present Imperial Commissioner of Agriculture for the West Indian Colonies, remained in the same capacity for two years. He was followed in 1880 by Mr. Marshall Ward, now an eminent Professor of botany in England, who was appointed for about a year only in the capacity of Cryptogamist for the purpose of investigating the coffee-leaf disease, *Hamileia vastatrix.*

X. Y.

NO. V.

Dear Sir,—In Ceylon,

"Where spring perpetual leads the laughing hours,"

the pursuit of botany has offered fascination to ecclesiastics as well as civilians. The genus *Gleniea* has been so-named by Sir Joseph Hooker in honour of that zealous botanist Rev. S. O. Glenie, F.L.S., who, being resident in the Colony from 1859 to 1871 as Colonial Chaplain and Archdeacon, made large collections of indigenous plants, chiefly in the Eastern Province, sending them with notes to Dr. Thwaites for incorporation in the "Enumeratio."

Few amateur botanists have cultivated a taste for botanical pursuits with more signal success than the late Mr. W. Ferguson, F.L.S., officer of the Survey Department and brother of the eminent editor Mr. A. M. Ferguson, C.M.G. Besides numerous papers and correspondence on botanical as well as zoological subjects, he issued in 1850 a unique and instructive book on the *Palmyrah Palm,* an 8vo. pamphlet now very scarce. The *Scripture Botany of Ceylon* formed the subject of an interesting pamphlet by him in 1859, followed by an account of the *Timber Trees of Ceylon* in 1863, *Ceylon Ferns aud their Allies* in 1881, and a brochure on *The Grasses of Ceylon* in the same year. The study of low vegetable organisms had also an attraction for him, and his collection of Algæ was incorporated in 1887 in the *Catalogue of Ceylon Algæ* by Mr. George Murray, F.L.S., of the British Museum. Sir Joseph Hooker, Sir Emerson Tennent, Drs. Thwaites and Trimen, all acknowledged their "copious and mutually instructive communications" with Ferguson; and, as is a customary compliment to men of repute, Sir Joseph Hooker dedicated the genus *Fergusonia* to him.

Mr. W. Ferguson had a worthy contemporary in Mr. George Wall, F.L.S., who published in 1873, for private circulation only, his *Catalogue of Ceylon Ferns,* a 4to vol. which was followed by his *Check List of Ceylon Ferns* in 1879. Cryptogamic botany was his favourite pastime, and his private collection of Ceylon ferns was very large. The tower of the Victoria Commemoration Buildings in Kandy, now opened, has been erected to the memory of Mr. Wall, by the Planters' Association of Ceylon.

The present state of knowledge of Ceylon Botany owes undoubtedly more to Dr. Trimen, who succeeded Dr. Thwaites in 1880, than even to the labours of his illustrious predecessors. Assuming the duties of head of our Botanical Department at the age of 35, with an already established reputation in Europe as a botanist, he by his great acquirements and steady devotion to science rendered yeoman service to the botanical world generally for 16 years, his death, truly in harness, occurring in October 1896. From the outset the reorganisation of his department upon more modern and utilitarian principles received his special attention, simultaneously with the investigation of the local flora, collecting and describing new species and elucidating ones hitherto imperfectly understood. He was an authority on Quinology, and in 1883 was engaged by the Madras Government to report on certain problems connected with the Cinchona industry of the Nilgiris. In 1886 he issued his Systematic Catalogue of *Flowering Plants and Ferns Indigenous to Ceylon,* an 8vo. now out of print; whilst in 1888 he published his *Hortus Zeylanicus,* being a classified list of plants grown in the Royal Botanic Gardens at Peradeniya. As co-author of the voluminous and standard work *Medical Plants* by Trimen and Bently, he was *au fait* in medical botany, which he turned to good purpose by establishing in Peradeniya Gardens a Botanical Museum, containing collections of native and foreign drugs, fibres, timbers, grains, curiosities, &c. Branch-gardens were founded by him at Anuradhapura and Badulla in 1883 and 1886 respectively. The pages of various scientific journals, more particularly the *Journal*

of Botany, of which he himself was editor from 1870 to 1880, were frequently enriched by Trimen's contributions on Ceylon Botany, and "no less than fifty papers" stand under his name at the Royal Society, of which he was a distinguished Fellow. His *magnum opus* is, however, his *Flora of Ceylon*, which, unfortunately for the Colony, he did not live to finish. The completion of this work has, happily, been undertaken by the veteran Sir Joseph Hooker of Kew, Dr. Trimen having completed the first three volumes, with an atlas of plates, which bring the book as far down as Balanophoraceæ in the order of Bentham and Hooker's Genera Plantarum. Sir Joseph has creditably accomplished his task, the fifth and last volume being now finished. The plan of Trimen's Flora is acknowledged to be a model of what such floras should be, it being, as far as completed by him, characterised by the critical insight and terse lucidity which always distinguished the author.—Yours truly, X. Y.

NO. VI.

DEAR SIR,—Though the real value of Dr. Trimen's "Flora" cannot well be estimated, more especially as Thwaites' "Enumeratio"—though superseding preceding works—is of use to botanists only, an idea of its merit may be inferred from the fact that "one principal object of the work is to enable observers to ascertain the name of any plant they may find growing wild;" afterwards learning "all that may have been written about it, appreciating its relationship with other plants, tracing its geographical limits, and intelligently investigating its properties and uses." In 1896, shortly before his death, Dr. Trimen contributed to the "Journal of Botany," Vol. XXXIV, *A Preliminary List of Maldive Plants*, with notes, based on a collection of plants sent him from the Maldive Islands, it being his intention to write later a *Flora* of these islands. Trimen's name is perpetuated in *Ficus Trimeni* and others; a tree of the last-named species forms a handsome object in Peradeniya Gardens. Vol. XXXIV of the "Journal of Botany" is dedicated to this *savant* and the same volume contains a memoir and a portrait of him.

In any account of the Botany of Ceylon it would be unjustifiable not to make reference to the compilations of Mr. J Ferguson, F.R.C.I., &c. the capable and esteemed multi-editor of 38 years' standing. In 1881 he started the *Tropical Agriculturist*, a monthly magazine devoted to the interests of tropical agriculture and inevitably touching botany and horticulture; whilst amongst his other labours are his compilations on the *Coconut Palm* (cocos nucifera) second edition in 1898; *All About Tobacco*, 1890; *All About Spices and Fibres*, 1888; *Arecanut* (areca catechu) 1897; *Tobacco*, 1889; *Coffee Planters' Manual* (latest edition), *All About Rubber*, 1899, &c.

With reference to the economic aspects of Botany in Ceylon, it is worth mentioning the unparalleled rapidity with which both the Cinchona bark and Tea industries developed in the island. The yearly export of the former (now but a few hundred thousand pounds) reached from 50 lb. in 1869 to nearly 16 million pounds in 1887; whilst that of tea rose from 23 lb. in 1873 to almost 130 millions in 1899, the estimate of export for 1900 being 140 millions.

Ceylon Tea

Who could estimate the virtues of that drink,
Which made not one, but many thousands think,
And write such works as made the vulgar stare,
And filled the world with disputations rare.

Before concluding this brief and incomplete bibliography of Ceylon Botany it is imperative to refer to the notable Sinhalese family of Natural History Artists, the de Alwises, who by their hereditary talent for drawing and painting connect the present day with practically the inception of Botanic Gardens in Ceylon. The late Mr. H de Alwis, Mudaliyar, served as writer under Moon in 1818 at Kalutara, being, after the removal of the Gardens to Peradeniya, appointed Botanical Draftsman, a post which he held for 38 years. In 1839 his services were solicited and secured by Dr. Wight for three months at Madras to assist in the botanical drawings for the great work Icones Plantarum Indiæ Orientalis. In 1861 Mr. de Alwis retired on pension which he enjoyed for the record number of 33 years. The orchids *Alwisia tenuis* and *Tæniophyllum Alwisii* have been named after him by Dr. Lindley. Mr. de Alwis was succeeded in 1865 by his son William (made Muhandiram in 1896) who, being still in office and with the gift of his father admirably developed, has added largely to the series of botanical drawings started by his father almost at the beginning of the century. He has painted from nature the Lepidopterous Insects of Ceylon, which with a few additions were published in 1880-87 in three *4to* volumes by F W Moore, F.Z.S., who supplied the text and in mistake put his own name to the plates. Mr. Alwis's drawings were of such high character that pecuniary assistance from the Ceylon Government was given for this work. The Rev. M J Berkeley, F.L.S. and C E Broome, F.L.S., in their *Fungi of Ceylon* (published in Journal of the Linnæan Society, vols. xi. xiv, and xv) accord their appreciation of Mr. W de Alwis's "exquisite drawings of the fleshy fungi of Ceylon" by naming after him the fungus *Hygrophorus Alwisii*.

The selection in 1896 of Mr. J C Willis, M.A., F.L.S., as head of the Ceylon Botanical Department and so succeeding the line of illustrious Directors preceding him, has been fully justified in the result. Mr. Willis has given the results of his investigation in the remarkable family of Podostomaceæ in a paper before the British Association at Dover in 1899. Since his appointment he has energetically carried on the extension of his department on scientific and practical principles, securing the establishment in the Gardens of a new Research Laboratory, and the appointments on his staff of an expert Entomologist and a professional Mycologist.

X. Y.

EXPERIMENTS IN MANURING TEA IN CEYLON.

DEAR SIR,—I see you take notice of Messrs. Tarrant, Henderson & Co.'s Circular, especially as regards the results of manuring, which the compilers show. The results are poor, and it does not require a manuring expert to advise the proprietor of No. 2 field to abandon that field.

The proprietor of field No. 3 must have had the cockles of his heart warmed when his manuring brought forth 426lb instead of 250; but he must have felt less jubilant when he found a second dose of manure reduced his bearing to 372lb. Perhaps the third manuring will land him at the original amount—250lb.

I have read hurriedly Mr. Kelway Bamber's report on tea soils, and as in scavenging carts in cities you have often a man in front ringing a large bell, I think our well-

known manuring expert should have an Elwood Helmet presented to him by Ceylon proprietors, on which the following words (page 74) might be lettered in gold:—"That the present crop in Ceylon could be increased by one-third or more there is little doubt, and this without the employment of very expensive, though perhaps somewhat, stimulating manures. But what would be the effect if new markets and demand did not keep up with the supply?"

In these days of so many subscription lists, terribly costly though they are, I however don't mind adding my mite for this charitable object, the gold lettering of the Elwood Helmet to be presented to our manuring expert.—Yours truly,

170,000,000LB EXPORT.

"HAS CEYLON THREE ROBINS?"

Dear Sir,—My question is in the heading. Tennent's "Natural History," page 241, speaks of "the rich and melodious tones of their clear and musical calls. In the elevations of the Kandyan country there are a few, such as the robin of Neura-ellia (Pratincola atrata) and the long-tailed thrush (Kittacinela macrura) whose song rivals that of their European namesakes; but far beyond the attraction of their notes, the traveller rejoices in the flute-like voices of the Dayal-bird (Copsychus saularis) called by Europeans in Ceylon the 'Magpie Robin.' This is not to be confounded with the other popular favourite, the Indian Robin (Thamnolia fulicata) which Edgar Layard said "is never seen in the unfrequented jungle, but always near the habitations of men." Who will describe for me then the distinctive appearance of each bird, in simple clear language so that I may identify the

(1) Indian Robin.

(2) Dayal bird or Magpie Robin.

And (3) the Robin of Nuwara Eliya.

and oblige—Yours truly, NEWCOMER.

[We quote as follows from Legge's big book on Ceylon Birds:—

(1) Indian Robin.—Thamnolia Fulicata (The Black Robin). Adult male. Length 6·2 to 6·4 inches; wing 3·0; tail 2·5; Iris brown; bill, legs and feet, black. Entire body, except the abdomen, glossy blue black, this, with the under-tail coverts, is fine chesnut; wings and tail coal-black; a large patch on the wing formed by the lesser and median coverts, white. This familiar little bird is a general household favourite in Ceylon, frequenting the vicinity of human dwellings, perching on walls and roofs, resorting even to the verandahs of bungalows. In the Northern and Eastern parts, where it is abundant, and likewise in many portions of the interior, it is by no means restricted as Layard supposed, to the neighbourhood of houses, but is found in all open rocky places, in newly burnt clearings, and in cultivated chenas, and in the Central Province it affects stony patnas and bare hill-sides. It is most animated in its movements, carrying its tail erect and jerking it up with a corresponding strutting down of its wings when giving out its pretty warble. It passes much of its time on the ground, darting about after flies and insects, and moving hither and thither with a short jerky flight. It consorts in pairs, but the young brood remain a long time with their parents, thus forming after the breeding season a little troop of three or four.

(2) Copsychus Saularis. (The Magpie Robin.) Adult male. Length 8·0 to 8·5 inches; wing 4·0 to 4·1; tail 3·5. Iris dark brown; eye-lid neutral brown; bill black; legs and feet plumbeous brown or blackish leaden, claws black. Head, neck, chest and upper surface with the scapulars glossy blue-black; quills and tail black; secondary wing-coverts, outer webs of tertials, under surface from the chest, under wing-coverts, three outer tail-feathers entirely and the next pair, except on the inner margin pure white; thighs white, black posteriorly. The white wing-coverts and outer webs of the tertials form a broad longitudinal band on the wing when closed.

The Magpie Robin is universally distributed throughout the whole island up to an altitude of 5,500 feet; there is no spot in the lowcountry, save the solitudes of the damp southern and western forests, where it may not from time to time be observed.

(3) The Nuwara Eliya Robin.—Pratincola Atrata. (The Hill Bush-chat.) Adult male. Length 5·9 to 6·2 inches; wing 3·0 to 3·25; tail 2·25 to 2·4. Iris hazel-brown; bill, legs and feet black. Above and beneath coal-black, slightly brownish on the lower part of the breast; tips of the rump-feathers, and all but the terminal portions of the tail-coverts, the median and innermost feathers of the greater wing-coverts, together with the centre of the abdomen and under tail-coverts, white. Not unfrequently one or two white feathers about the nape exist, and the amount of this colour on the rump and lower parts varies somewhat.

The Hill-Chat is only an inhabitant of the upper mountains and even there its limit is markedly defined.

ROUND THE WORLD FOR CEYLON TEA: IN THE FROZEN NORTH.

Mount Stephen, Rocky Mountains, Jan. 27.

Dear Sir,—The last time I wrote you was on the banks of the Atbara River squatting on the sands under the piercing rays of a tropical sun, with my faithful Soudanese servant "Hassan" in attendance, and Teck making a feed on rushes before taking his master back to Berber.

As I now write the surroundings are somewhat different. Here I am seated in the Canadian Pacific Railway Pullman Car "Montana," which forms part of the train, which with two engines is slowly creeping up the steep gorges of the Rocky Mountains which are covered with snow many feet deep, and the thermometer forty degrees below zero. In an hour we hope to be at Mount Stephen Station which is 5,296 feet above the sea; the highest point in Canada as yet reached by the iron horse. At this time of year few passengers cross the Rocky Mountains, today I am the only occupant of the Pullman Car, which has sleeping accommodation for thirty-four passengers fitted up with electric light, steam pipes to regulate the heat, large smoking room, lavatories, &c., These cars are so heavy, and well balanced, that even when running at a high rate of speed, I have no difficulty in writing with my typewriter. Leaving San Francisco on the 21st inst. by the Northern Pacific Railway, a distance of 1,500 miles which is covered in three days and three nights brings you to Vancouver, the Western terminus of the Canadian Pacific Railway. The growth of this city which now numbers 26,000 inhabitants, has been very rapid, and only dates back to 1886. The city has many fine stone buildings, streets are lit by electric light, and paved with wood blocks and asphalt. Electric cable cars run to all parts, and past the doors of the twelve banks which this new city can boast of.

The climate of Vancouver is wet and mild ; snow may be seen on the mountains which surround the city for five months of the year, but it is seldom that it falls in the city.

The distance from Vancouver to Halifax (which is the terminus of the railway on the Eastern coast) is 3,666 miles, the journey occupies a week ; the passenger only changing cars once. Leaving Vancouver the scenery is very beautiful, as the train winds its way along the bank of the Fraser River, which is known throughout the world for the large numbers of salmon that are caught every year, canned and shipped to all parts of the world.

On wakening the following morning the scenery is very different. the train which the day before was covering some sixty miles an hour, is now creeping slowly up the sides of steep gorges through which torrents of icy water are rushing ; on either side stand gigantic cliffs towering hundreds of feet above, covered with ice and snow. At noon we reach Glacier House, and stop for lunch. Last year the fall of snow at this particular point registered fifty feet. Facing the station stands the "Great Glacier" only half a mile distant, an amazing sight, as you will imagine when I tell you that this field of perpetual ice covers some 200 square miles, some hundreds of feet in thickness. To the left of the "Great Glacier" rises Mount Sir Donald, a naked and abrupt pyramid to a height of a mile and a half above the station. This stately monolith was named after Sir Donald Smith, now Lord Strathcona, Agent-General in London for Canada, the man who has offered to equip and transport to South Africa 400 picked Mounted Infantry at his own expense; the cost of which I have heard will exceed two hundred thousand pounds sterling. Leaving Glacier House the train continues its winding route steadily climbing up the sides of the steep gorges, now and again diving through long snowsheds, which have been built where it was found impossible to keep the line clear of snow. During the winter months hundreds of men are employed in removing the snow off the line in these parts.

As I am writing we are steaming out of Mount Stephen Station, above which stands Mount Stephen towering 8,000 feet above the valley, to the left is seen a huge green glacier 800 feet in thickness. The cold here is more than a typewriter can describe ; and as darkness has set in I think bed the best place, leaving my letter to be continued tomorrow.

Moose Jaw, Jan. 28.—Rising at 9 a.m. I found the train travelling at a good pace along the great prairie plateau which extends for some thousands of square miles to the north and east of the Rocky Mountains, which are now out of sight. In winter this great prairie is enveloped in snow and ice ; in summer it is covered with rich grass, not a tree to be seen. At the stations where we stop, Indians board the train and offer milk and buffalo horns for sale. This race who in the past were renowned for their powers in hunting big game, and for their brave and fierce methods of fighting, are fast becoming extinct. Tomorrow we enter the more civilized regions wherein summer farms covering thousands of acres may be seen under wheat. In the evening we arrive at Winnipeg, where I will stay for two days before continuing my journey to the East Coast, *en route* for Paris. This afternoon the Conductor took compassion on my solitude and began to give a detailed account of what I would and would not see as we went farther East ; I soon brought him up with a round turn, by informing him that "this was my eighth journey across this track in the past seven years."—Yours truly, R. VALENTINE WEBSTER.

LABOUR IN INDIA AND CEYLON.

Coonoor, Nilgiris, Feb. 23.

SIR,—There are upwards of 3¾ millions of people now being relieved by the Government of India in connection with the present famine, and as the population in this year is increasing at the rate of six millions, or two per cent per annum, and this rate will continue in larger numbers every year, it is evident that famines in the future will become more and more costly. That financial difficulties must ensue is evident, and just as the previous difficulties were met by forcing up the exchange, so will future financial embarrassments be met by the same expedient with the view of reducing the home charges. There are two reasons why it is certain that the same expedient will be resorted to—the fact that the unpopularity necessarily accompanying fresh taxation will be avoided, and the still more influential fact that the officials, who are really the rulers of India, will gain largely by still further raising the rate of exchange. That they will seize the first pretext for doing so in the future as readily as they have done in the past, no one can doubt, who has the smallest experience of human nature. The planters of India and Ceylon will have to face two serious facts—the fact that they have been placed at a great disadvantage in competing with their rivals in the other silver-using countries, and the fact that there is every prospect, I might almost say certainty, of their being placed at a still further disadvantage. Does any one believe, or can it be for one moment supposed, that the producers of India and Ceylon and the capitalists who work in conjunction with them are blind to these facts ? That they are not so is proved by the facts which appeared in the leading article of the *Ceylon Observer* of Feb. 7, which tells us that in 1899 (when it was certain that the Government would adhere to its fatal currency policy) the cooly immigrants fell off by about half, while the departures exceeded the arrivals by 13,000. And that both producers and capitalists are rightly judging the situation, we have ample evidence in India where wages are being reduced, and advances too, all of which indicates what everyone knows, namely, that extensions have been stopped, and that land is being thrown out of cultivation, being either wholly abandoned, or put into an inferior state of working. There is only one thing that can arrest this decline, and that is the granting of such a Bounty on exports as will place producers in the same position which they occupied previous to the closing of the mints. The producers would be thus placed on a secure footing, confidence would at once be restored both to them and to the capitalists, and India and Ceylon would soon exhibit the same signs of progress which they did previous to the closing of the mints, and about up to the time when it was certain that they would not be reopened. The proposed step would probably call for a further raising of the exchange, but this would be all in favour of the proposed measure, ere the officials would gain on their home remittances,

and they, as we know, are masters of the situation both in India and, in the shape of the India Council, at home. The Secretary of State may be reckoned on as being usually in the hands of the Council, and the Governor-General as being in the hands of the Secretary of State when the adoption of any new policy is concerned. Parliament, I need hardly say, is absolutely out of the count.

In conclusion I may remark that nothing could (vide p. 464 of "Gold, Sport, and Planting) be more certain than that the first effect of the currency measure would be a diminution in the demand for labour, and if it did not sooner occur it was partly because it was not generally believed, that the Government would persevere with its currency policy, and partly to a vague hope that the second Currency Committee might reverse the decision of the first, for which indeed there was some ground as the witnesses were nearly all against the policy which has been carried out, and a change from which it is now hopeless to expect.—Obediently yours,

ROBERT H. ELLIOT.

THE LONDON COCOA MARKET.

London, Feb. 23.

Dear Sir,—As usual when the new crops of Trinidad and Grenada Cocoa first arrive in any quantity, the pressure to sell being out of proportion to the desire to buy, has caused a drop in prices, which is unwarranted by the present state of the market; for with a good demand which is sure to last, the stocks are very small being only 79,203 bags, against 90,435 bags in 1899, 113,918 bags in 1898, and 139,538 bags in 1897, and there are outside influences now at work creating an exceptionable demand which were altogether absent in previous years; and even if the supply this year proves to be as large as that of 1899, which it is generally believed will be the case, the South African War will keep the Government active buyers for another six months at least (Monsieur Jean Bloch, the Polish author of "The Theory of Modern Warfare," estimates it will take a year to see the matter properly through) and the American and continental demand is expected to show as large an increase in the coming year's consumption as they have done in the past one, which makes me convinced that by June those who are now anxious sellers will see the mistake they have made; for, if they do not show a firmer tone than they are now doing, we shall have good middling to good red Trinidads at 73s and Fine Grenadas at 65s before the end of April. As during the last two years there has been a tendency to handle fine Trinidads more judicously, this grade is not likely to show a great drop, if indeed they do not go higher, as is the case just now, for whilst good middling red is now selling at only 78s against 82 and 82s 6d three weeks ago; one of the fine marks sold last week at 84s 6d against only 82s 6d in Jany. Ceylon Cocoa it is true often fluctuates independently of Trinidads, being used more for confectionery, for which purposes its finest marks fetch fancy prices, and also because up to now the bulk of the crop has been sent exclusively to London, which, forcing the best buyers to come together from all parts of the world as Russia, America, Spain, and even Mexico when her crop is short, causes a keen competition resulting in high rates which would never be obtained if she sent her cocoa to every market under the sun that buys it, as Trinidad is so fond of doing, and which is a great mistake, for not only does it, as I have already said, prevent buyers coming together in one common centre, but the cocoa is often shipped entirely to one buyer who having it all to himself squeezes the prices down to the utmost limit he can before he forces the owner to ship it elsewhere, and sell at a betterrate

At the sales this week 6,783 bags of all growths were offered including 419 Trinidads, 1896 Grenadas, and 800 Ceylons. Of these the Government bought 214 bags of Trinidad at 78s and 78s 6d, 167 bags of Grenada at 69s to 70s and 76) bags Machala Guayaquils at 73s 6d. The sales went off with good demand at slightly lower rates for Grenadas, and Dominicas, for out of 2,500 bags offered 1800 bags sold; Grenadas at 65s 6d for common to 71s 6d for fine, and Dominicas at 65s 6d to 67s. The Ceylons nearly all sold, (707 changed hands at the sales) at 68s for native, 62s 6d to 66s 6d for smalls—70s to 77s for middling to fair—and 80s to 86s for good to fine red. Since the sale the demand has been quiet as there is expected to be big sales next week. The West India mail had nearly 4,000 bags of Trinidads alone, which they are trying to get up in time, whilst of Ceylons the cocoa by the "Duke of Buckingham" and if possible by the "Awa Maru" will be offered.

The receipts from Guayaquil are still large, and up to now in excess of last year's, being 36,710 quintals since 1st January against 26,400 quintals last year, and 33,000 quintals in 1898. Cocoa butter is firm: sales have taken place at 1s 5¾d and 1s 6d is now asked.—Yours truly,

HAROLD HAMEL SMITH.

TEA: LONDON CHARGES ON.

Kandy, 27th Feb.

Sir,—I herein enclose copy of letter received from the Secretary, Ceylon Association in London, on the subject of the reduction of Bulking and Taring Charges in London.—I am, sir, yours faithfully, A. PHILIP.

Ceylon Association in London, 61, and 62, Gracechurch Street, E.C., 9th Feb. 1900.

A. Philip Esq., Secretary, Planters' Association, Kandy.

Dear Sir,—Referring to my letter of 26th ult: I beg to forward copy of a second letter from the Tea-clearing House Committee, dated 5th instant, from which it will be seen that for the present it is not proposed to make any reductions except in respect of the Bulking and Taring rate.—Yours faithfully, (Signed)

Wm. Martin Leake, Secretary.

Tea Clearing House Committtee, 21, Mincing Lane, 5th Feb. 1900.

The Secretary, the Ceylon Association in London, 61, and 62, Gracechurch Street, E.C.

Dear Sir,—Referring to my letter of the 23rd ult. I am directed to inform you that the reduced Bulking and Taring charges therein set out, have now been confirmed and will apply to all teas bulked and separately tared on and after the 1st March next.

This alteration is a considerable reduction and the Committee trust it will enable the Importers to make desired arrangements with the Trade in respect of the taring of the teas. The Committee, however, regret that in view of the heavy expenses pressing upon their trade they are unable at present to make further alterations in the rates.—I am, dear sir, yours faithfully, (Signed) Geo. T. Pocok, Secretary.

MINOR PRODUCTS REPORT.

ANNATTO SEED.—A bid of 3d per pound for fair bright Madras seed is likely to be accepted for a parcel of 13 bags. There was little on offer today compared ith previous sales.

CINCHONA.—Our Amsterdam correspondent informs us that the Vriessveen cinchona bark department reports the shipments from Java to Europe from January 9th to February 12th, 1900, at 715,000 Amst. lb.

CINNAMON OIL.—Leaf oil sold at 1½d per oz., sbuject.

COCA LEAVES.—In auction fair green Ceylon leaves realised 1s per pound for one bag. The shipments from Java from July 1st to November 30th, 1899, have been :—

	1899	1898	1897	1896	1895
Bales	202	445	496	335	509

Dark green Hnanoco leaves are offered at 1s 4d per pound, c.i.f. and light green Truxillo at 1s 1d.

QUININE.—The exports of qninine from Java during November, 1899, were in one consignment of 133 cases to the United Kingdom (opt. New York). The shipments from July 1st to November 30th, 1899, were 655 cases, against 614 cases for the coresponding period of 1898.—*Chemist and Druggist*, Feb. 17.

DEATH OF AN OLD CEYLON PLANTER.

Our obituary includes the name of a well-known former planting resident in Ceylon, but who has latterly been tea planting in Natal, Mr. John Fraser. He was in his day a very strong man; but after enduring all the worries and trials appertaining to the life of a coffee estate proprietor in one of the wettest parts of Lower Dikoya and then fighting away till he got the estate into tea and became Superintendent where he had been proprietor, his health broke down, and a succession of abscesses on the liver undermined his constitution; indeed the late Dr. MacDonald was amazed at his repeated recoveries. A time of great weakness, however, arrived ; and on our advice, "Aberdeen" Fraser went to Carlsbad, and came back in four months looking and feeling as well as ever he did in his life,—a marvellous case of the waters taking effect when a man was very far gone indeed. No one could persuade Mr. Fraser not to go back to "Aberdeen" estate and he worked there for two or three years in good health until he moved to Brae estate, Matale—a still wetter region if possible !—and there also he did good work and kept well. After some years, there came the offer through a brother to go as Manager of a Tea place in Natal, and Mr. Fraser has been in the "Garden Colony" since January, 1897, well-pleased with his work : but here again he had a narrow escape of poisoning at the time his brother James, who was visiting him, fell a victim. It is, perhaps, therefore, no wonder that the end has come to Mr. John Fraser in his 60th year. We do not know if he was touched by the war or had trouble therefrom; but in his day, certainly Mr. John Fraser of Aberdeen, Brae and Natal, had his full share of battling with misfortune and with physical ills, while he always showed an example of putting "a stout heart to a stey brae." Mr. Fraser has left a son in Ceylon, now Manager of Nicholoya, Matale. To him and other relatives, we tender sympathy on this sadevent.

BOTANY AND THE INDIAN FOREST DEPARTMENT.

AN APPEAL.

(To the Editor "Indian Forester.")

Anent the letter of Dr. Schlich in *Nature*, copy of which appears in your issne of December last, regarding the above subject, every Forester, it is thought, of some standing and experience, will agree with almost everything he has said in answer to Sir George King, with this exception: that it is not believed that the lack of knowledge of botany displayed by most Indian Forest officers is due so much to the want of well equipped systematic botanical instructors at Coopers Hill as Dr. Schlich alleges. With the botanical instruction now acquired at the College, Forest officers, it is felt, should have been able to increase their knowledge of the subject in India if a *real* interest had beeu taken in the subject originally; what is needed it seems is that men must be recruited for the Indian Forest service from among those who are botanically inclined, and to attract such men, botany as even now taught, must not only be made compulsory, but placed in the forefront of the subjects for the entrance and after examinations of the College. By forefront is meant that a much larger number of marks should be given for botany than for any other subject.

As far as can be ascertainsd the large majority of men who have joined the Imperial Forest Service during the past 10 or 11 years have relapsed into administrators pure and simple, and little difference is apparent between their present qualifications and those in the Indian Civil or Police. In fact as far as external appearances go their previous training might, to all intents and purposes have been the same, originally as the training of the former.

A modification in the present system of marking at Cooper's Hill therefore is suggested in the manner explained, and more constant practical instruction in botany should be imparted to the stndents while at the College. Examinations, chiefly oral, should also be held in this branch of their studies, as well as in Forest organization, while on tour. The latter subject is doubtless very valuable, and needs much attention but it can be acquired and improved upon in India to a very great extent because of officers being forced *nolens volens*, to study it. Working plans in fact can be drawn up by any educated Forester with the aid of Dr. Schlich's admirable works, and with a little previous practical continental experience such as most Foresters obtain. And if it could be ruled that no Forest officer of less than seven years standing should be a working plans officer so much the better.

Sir George King has done a service in drawing attention to the want of knowledge of even elementary botany among Indian Foresters, and a discussion it is hoped in your columns will now follow, bearing on his remarks as reproduced by Dr. Schlich. The Forest Department is still practically in its infancy and by a discussion among men now out here, who have almost completed their time and who would be capable of giving an opinion as to how best to remedy the unsatisfactory state of things (as unsatisfactory they must be termed), some valuable suggestions might be thrown out which would be of use to tbe authorities at home in coming to a decision in the matter.

It is trne, that we do not require men to be only botanists; but those who enter the Forest service should display a greater leaning towards the study of trees, shrubs and small plants than the large majority especially from Cooper's Hill now do. D. C. O.

25th January, 1900.—*Indian Forester*, February.

TREES.—The Government of India have sanctioned the expenditure of sums not exceeding R1,000 in each case for tree planting in Wana and in the Tochi Valley.

QUININE.

Mr. Martin mentioned the labours of Richard Spence, Pritchett, John Weir, Robert Cross, Charles Ledger, De Vrij, and others who were pioneers in the establishment of cinchona-culvation in Java, India and Ceylon. He then called attention to the superior quality of the *Ledgerina* variety of *Cinchona Calisaya*, which yields from 9 to 10·5 per cent of quinine,* with 10½ to 11½ per cent of total alkaloids.

The cultivation of cinchona in India, and the preparation and sale of cinchona febrifuge there, were next referred to, the methods of cultivation also being briefly noted. From this the author proceeded to mention the principal facts in respect to the discovery of quinine and other cinchona alkaloids, and described some of the methods for manufacturing quinine which had been published. He then submitted the following short descriptions of salts of quinine:—

ACETATE.—Rather more soluble in water than sulphate.

ARSENIATE AND ARSENITE.—Recommended by some doctors as more powerfully antiperiodic than the other salts; contains twenty-nine per cent arsenious acid, and 69·4 per cent quinine.

BITARTRATE.—Sparingly soluble in water, and has, therefore, little taste. In a number of prescriptions by a West-end physician I observed quinine sulphate and citric acid frequently prescribed; one day I questioned him as to why, when he told me that it was the most useful salt of quinine to administer to patients having a tendency to acidity.

FERROCYANIDE.—Said to be most efficacious.

HYDRIODIDE.—Alterative, tonic and antiperiodic, used in scrofulous affections.

HYDROIDIDE, ACID.—Soluble 1 in 20.

LACTATE.—Soluble 1 in 20; used for hypodermic injections.

HYDROBROMIDE.—Excess of hydrobromic acid given to lessen cinchonism sometimes caused by large doses; contains 76·6 per cent.

HYDROBROMIDE, ACID.—Well adapted for hypodermic injection.

HYDROCHLORIDE.—Richer in alkaloid than sulphate (81·8 per cent); antiseptic; powerful germicide, 1 in 800 stopping growth.

HYDROCHLORIDE, ACID.—Most soluble salt of quinine (1 in 1); contains 72 per cent.

HYDROCHLOROSULPHATE.—74·3 per cent alkaloid.

HYDROCHLOROCARBAMIDE.—Urea quinine; not rich in alkaloid

PHOSPHATE.—For rickets associated with stomach-affections; contains 76·2 per cent.

SALICYLATE.—Contains 70·1 per cent alkaloid: useful in rheumatic gout.

SULPHATE.—This salt is the most used of any; contains 73·5 per cent alkaloid; wherever quinine is ordered by the physician it is universally understood to mean this salt.

SULPHATE, ACID.—Soluble 1 in 11 water, and contains 59·1 per cent alkaloid only.

TANNATE.—Useful for intermittent neuralgia; only 20 per cent alkaloid in it; almost tasteless, and covered with chocolate, is given to children.

TARTRATE.—Used in India for hypodermic injection.

VALERIANATE.—is of no special value for the antispasmodic purposes for which some give it; contains 73 per cent alkaloid.

Finally the physiological action of the alkaloid was discussed, and some reference made to the prices that had been paid, the highest since 1874, when quinine sulphate was 9s per oz, being 16s 6d in 1881, and the lowest 8⅔d for the German sulphate.

Mr. Hymans, in opening the discussion, said he thought it curious that artificial quinine had never been synthesised except from cinchonidine, although all kinds of ways had been tried. With reference to the dose of quinine sulphate, he mentioned that the one usually taken in the tropics was much higher than that in Engand, 10-gr. doses being quite usual.—*Chemist and Druggist*, Feb. 17.

* This is incorrect; the following are some of the percentages in Ledgeriana bark offered at the last cinchona auctions at Amsterdam, the figures representing quinine sulphate 2·3, 3·1, 4·1, 5·2, 6·2, 7·3, 8·6, and 10·6, with many percentages between these figures. Occasionally a bark yielding as much as 12 per cent of quinine sulphate comes into the market, but the assumption that Ledgeriana bark yields a minimum of 9 per cent is erroneous: the average is about 5 per cent, and the highest known 14·5. It is particularly to be noted that these percentages do not refer to the alkaloid quinine, but to quinine sulphate of the British and other Pharmacopœias. Most materia medica text-books fall into the same error as the writer of this paper.—ED., *C. and D.*

PRODUCE AND PLANTING.

TRY KASHGAR.—In his very interesting and instructive book, "Innermost Asia; Travel and Sport in the Pamirs," just published by Mr. Heinemann, Captain Cobbold has something to say about trade with Kashgaria which will interest tea planters. The Government might do much to facilitate British and Anglo-Indian trade with Kashgar, the commercial centre of innermost Asia. Only removable obstacles stand between tea planters of India and an enormous market in innermost Asia. The British acquisition of Chitral gives the Indian Government an opportunity of establishing commercial routes easily and speedily traversible.

TEA IN BOND.—At a recent meeting of the Grocers, Provision Dealers, and Oilmen's Association, a letter was read from a member asking whether, in the event of there being any increase of the tea duty, such increase would be charged on any duty-paid tea lying in bonded warehouses at the time. In the course of the discussion it was stated that Messrs. Densham Brothers had received a letter from Mr. R. T. Prowse, secretary to the Customs, stating that "the Board feel bound to withhold assent to the retention of tea in bond after duty has been paid on it. . . . It is quite intended to exercise all the powers we may find ourselves to be possessed of to prevent the wholesale retention of duty-paid stock in bonded warehouses." It was resolved to call the attention of every member of the Association to the importance of bearing in mind that this decision of the Customs applied, of course, to all dutiable articles. The following is the correspondence referred to:—

Letter to the Mazawattee Tea Company:

"Office Inspector, Customs, London, February 14, 1900.—Gentlemen,—With reference to a recent large payment of duty on tea by you, it has been reported that on the 6th inst. there still remained 11,460 packages of tea in various duty-paid warehouses in London, of which delivery had not been taken, although duty had been paid. I am desired by the Commissioners of Customs to ascertain from you what steps are being taken for the withdrawal of these packages from bonded premises with as little delay as possible.—I am, gentlemen, your obedient servant, (signed) J. FLEMING, Office Inspector."

"Eastcheap, E.C., February 15, 1900.—Dear Sir,—We are in receipt of your letter of yesterday's date, and in reply beg to state that we have spared no effort to keep strictly to the regulations which your Board enforces. Immediately on payment of our big cheque steps were taken by us to clear out of the bonded warehouses without delay the various parcels represented by our payment, and up to the date mentioned by you—viz., February 6—we had removed nearly 45,000 packages, or fourfifths of the bulk. Had it not been for the exceptionally severe weather the whole of the tea would have been cleared. We feel sure that you will realise the magnitude of the task imposed by your regulations of clearing over five million pounds of tea from bond within a few weeks.—We are, dear sir, yours faithfully, THE MAZAWATTEE TEA COMPANY, LIMITED."—*H. and C. Mail*, Feb. 23.

TEA IN CEYLON: EXPORTS IN PROPORTION TO AREA PLANTED.

IS IT WELL TO MANURE TEA ON VIRGIN SOIL?

The question has lately been raised in practical quarters as to whether the export of tea from Ceylon of recent years has kept up with the extension of planted land. We have heard a decided negative given, and the explanation offered that, apart from actual abandonments of unprofitable fields, much tea on poor land had fallen off in yield and that, even if manured, such poor tea failed to respond for more than one or two seasons and then fell back into a worse state than before, more especially if a stimulating fertiliser had been used. In these days of almost universal belief in the virtue of manure—properly selected and adapted of course,—it is somewhat refreshing to meet with practical men who are not only doubtful, but sceptical of the advantages of manuring from the proprietor's point of view, if a series of years be taken into consideration. Given a decent soil with a carefully planted field of hardy hybrid jat in a suitable climate; and "leave well alone" would be their motto. "Content yourself with an average 400 to 500 lb. yield; do all justice in careful pruning, weeding, tillage, burying prunings with a little lime perhaps; and leave the rest to Providence,"—is very much their idea of what is right. "No doubt," they add, "by manuring you can increase your yield by from 25 to 40 per cent. for some years; but your trees suffer in the long run and the yield eventually falls off."

Now as regards a problem of this kind, no doubt a good deal will be learned from the forthcoming Report of Mr. Kelway Bamber, in which, of course, the virtues and effects of manure for tea plantations are most fully discussed. Nor is this done simply from the point of view of the Laboratory and Analytical Chemist. For, Mr. Kelway-Bamber has had a special advantage in visiting every tea district in the island, in getting the fullest information respecting typical estates in each, and in profiting by the experience and observation of many of the shrewdest and most successful of our practical planters, an incalculable gain to the scientist however advanced he may be in his own Department. Nevertheless for the purpose of answering the problem now raised, we should think it preferable if scientific attention had been directed to two typical and therefore old plantations—one of which had never been manured, while the other had had systematic if not continuous applications. Now, for the former, we should be inclined to suggest, above all others, the Loolecondera estate with perhaps the oldest continuously bearing tea in the island. We have been accustomed to get reports at intervals from the manager of this estate for embodiment in our "Handbook and Directory." The latest was courteously furnished by Mr. G. F. Deane on 20th May, 1898, when he wrote as follows:—"Replying to your letter of 17th, the oldest field of tea" (30 to 32 years of age) "on Loolecondera is still looking remarkably well and continues to give yields varying from 400 to 500 lb. made tea per acre per annum. It last year received a heavier pruning and cutting down than it ever had before and looks all the better for it. The ground is a a network of roots and the stems of the bushes are very thick. This tea is now some 30 years old, is very wind-swept in the South-west monsoon and has, I believe, never been manured." There is one exception (and but one only, we believe) to the last clause: in July, 1891, (about a year before his death) Mr. James Taylor, who first planted the tea on Loolecondera, reported to us:—"The field is as good as ever, giving about the same crops: it was manured once only with castor cake in the beginning of 1885." The one exception may surely be said to prove the rule in the case of Loolecondera if the tea of this field still continues up to the mark at 32 to 34 years of age? Now, it ought to be of great interest to have a special report on this unmanured estate, giving, from a scientist's point of view, the reasons why the tea is still in such good heart, with yields if anything increasing, or at any rate, steady year by year. Surely there is encouragement in the case of Loolecondera to proprietors of tea fields formed out of virgin forest, to follow the same course of careful cultivation without manuring? Of course, the lesson might be still more instructive if Mr. Kelway-Bamber were to find a similar estate where an opposite, or "manuring", policy had been adopted from an early age, with a better result in crops and with trees—at 25 to 30 years old—if such there be in Ceylon—even healthier and more vigorous than those of Loolecondera.

We are leaving out of view here the case of tea planted on old coffee estates, or on land otherwise used up or washed out. There, the choice may be: "manuring" or "abandonment." The question we propound is in respect of tea estates formed out of virgin land, doing well and in good heart, or if showing any slackness, only of a few months' duration, due to seasonal influences.

We must now leave this subject, to revert to the more particular and statistical enquiry raised in our opening sentences, namely, Has the Ceylon export (or crop) of tea of late years increased in proportion to the area of young tea coming into bearing? This demands a very careful examination of the figures in our Handbook—more than we are prepared to give today—but before closing for the present, we should like to lay two sets of figures before our readers, making the following contrast:—

In 1888, the total area planted with tea was, as near as we could make out, 183,000 acres, (of course, most not in bearing) the total export of tea that year was 24,381,296 lb.

In 1893—six years after—the area had risen to 273,000 acres: the total export to 84,406,064 lb. = an increase of 90,000 acres under tea and 60 millions lb. more tea exported.

Six years later, in 1899, we have an estimated area under tea of 375,000 acres—an increase of 100,000—while the total export of tea reached to 129,854,156 lb. (above the estimate, but) an increase of less than 45½ millions over 1893. We are aware that this is a very rough mode of instituting a comparison, and that much importance cannot be attached to our figures in support of any theory. Still, their suggestiveness is undeniable; and if they lead some of our 'tea" authorities among proprietors, visiting agents, managers and thoughtful mercantile observers, to ponder the subject-matter, our purpose will be fully served.

AGRICULTURAL DEPARTMENT IN JAMAICA.

The Report of the Committee respecting the Establishment of an Agricultural Department and an Experimental Station, has appeared. We quote:—"For the organization and management of this Department there should be constituted a Board of Agriculture. It should have the same sort of control over the whole Department that an ordinary Head of a Department would have, subject to the usual control of the Government over all Departments, and subject also to the fixing by law or by the Government of any functions of any Branch of the Department. The Board should consist of :—(1) The Director of Public Gardens, *ex officio*. (2) The Agricultural Chemist, *ex-officio*. (3) A person appointed by the Governor on the nomination of the Managing Body of the Agricultural Society, (4) Six members appointed by the Governor and holding office during his pleasure, one of whom should be an elected member of the Legislative Council. Of these six members two should retire annually in the order of their appointment, but be eligible for re-appointment. (5) The Commissioner of the Imperial Agricultural Department of the West Indies should be *ex-officio* a member of the Board to enable him to attend the meetings of the Board on his visits to the island. The Chairman of the Board should be annually appointed by the Governor from among the members of the Board, The Governor should have power to give leave of absence to any member of the Board, and to appoint a person to act in his place during his absence. Provision should be made for paying the travelling expenses of country members of the Board in attending meetings. The Board shall meet at least once monthly, three members to be a quorum. The present Secretary of the Agricultural Society should be the Secretary of the Board. The powers and duties of the Board should be :—(1) To correlate and re-distribute the work of the subordinate Branches as opportunity offers, and to create new agencies and direct new efforts in any line of Agricultural progress. (2) To make arrangements for the carrying out by any Branch of the Department of instructions received from the Government; or for the discharging of any duties imposed upon the Board by Law affecting Agriculture. (3) To consider and report to the Government upon any matter affecting agriculture seeming to the Board to need consideration or action. (4) To be the channel of communication between any Branch of the Department and the Government. (5) To receive the annual estimates of the different Branches, to consider, to alter if necessary, and to confirm them, and to forward them to the Government, together with estimates for its own expenditure. The Chairman of the Board should be the accounting officer for the direct expenditure of the Board; and some member of the present Staff of the Department under the Director of Public Gardens should be the Clerk in charge of the accounts. (6) To make its own annual report to the Government, and to forward to the Government the Reports of the subordinate Branches of the Department, either separately or incorporated with its own report." Dr. Morris concurs in all this and a great deal more, for instance :—"The Departments and Agencies to be brought into immediate organic relation with the Board, and to have their work more or less combined under the Board for Agricultural purposes are:—(1) The Department of Public Gardens. (2) The Government Laboratory. (3) The Agricultural Society. (4) The Experiment and Teaching Station to be created at the Hope University College though not a Department will require to be brought into close relations with the Experiment and Teaching Station. The management of the Teaching Station should be under the general control of the Board, but the detailed carrying out of plans should be under the direction of a body to be called 'The Station Committee.' This Committee should consist of :—(1) The Director of Public Gardens. (2) The Principal of University College. (3) The Agricultural Chemist. (4) The member of the Board nominated by the Agricultural Society. (5) Any other specially qualified person whom the Board, after receiving the advice of the Station Committee, may appoint."

HOW TO REDUCE THE CEYLON TEA CROP:

A PRACTICAL SUGGESTION.

March 10.

Sir,—With reference to "Tea Farmer" 's letter (see page 708) I beg to put before you a scheme for curtailing our crop by 10 per cent. *without* resorting to the need of letting our estates "lie fallow," etc., and, moreover, one which will affect all growers equally.

In short the idea is to raise the present "cess" to one or two cents per lb. and utilize the revenue secured to pay for the tea withdrawn from export or sale locally.

(1) For argument, say, the output is 100 million lb. for 1900.

(2) Prices are supposed to have "touched bottom," *i.e.*, are only equal to cost of production.

(3) Granted that a shortage of 10 per cent. will *more* than raise the average price a like amount, when

(4) No further expense for "booming" Ceylon tea will be necessary.

Now, the present "cess" at one-fifth cent per lb. on 100 million lb. produces R200,000 revenue; and at one cent per lb. do. R1,000,000 do.

This would purchase—

3 million lb. tea	at	33⅓	cents	per	lb.
4	do	do	25	do	do
5	do	do	20	do	do

and, should we submit to two cents per lb. cess, would purchase six, eight or ten million lb. per annum.

Each estate would be obliged to provide for sale, at the price fixed, an *average* break assessed as regards quantity by the "Thirty Committee," C.P.A., and the tea so secured would be destroyed or used as manure at their discretion.

The total intermediate loss to the producer would be about three cents per lb., but the nett ultimate gain—granting that the above conditions (1 to 4) hold good—would be five to ten cents per lb. at the end of the year.

The above may or may not be practicable, but it is, I believe, an original theory and could be put to the test if the condition of the Tea Industry becomes desperate.—I am, yours truly,

PLANTER.

CEYLON TEA EXPORTS: CAN THEY BE REDUCED?

A correspondent puts forward (see above) an original and, possibly, practical —though, we fear, not practicable—scheme for reducing the total export of tea. Theoretically, there is not a great deal to be said against it; it raises the "cess," it is true, but the extra charge will, according to "supply and demand", find its way back in to the pockets of the producer, in the shape of an extra 5 to 6 cents a lb. at the end of the year! This would be a correct enough method of arguing, if only the details of the scheme had to be considered *per se*. But there are inevitable and, we feel certain, insuperable objections:—

(1.) Small as the present tea-cess is, there are murmurings beginning to be heard against its imposition at all. The work accomplished by means of the Cess Fund, it is argued, has gone so far. that it can go on now by itself without further commissions and commissioners. We do not share this opinion, but it exists; and the wholesale raising of the cess would meet with instant opposition.

(2.) It is not likely that the Ceylon planters will produce tea with the off-chance of its being destroyed or used as manure!

(3.) If Ceylon, by a united effort, agreed to any such monster—we will not say "monstrous"—plan, is there any guarantee that India will not step in and increase supplies by an opposite kind of effort; and the whole machinery of raising prices will be instantly upset? We believe there is none, and that the "putting to the test" of "Supply and Demand"'s scheme would be considered far too hazardous an experiment ever to receive a trial.

Passing to the wider question of tea-producing as affected by the rise in the tea-duty, we find it is the belief locally that the producer must suffer considerably, owing to the accumulation of stocks in the hands of big buyers, stocks accumulated in anticipation of the extra 2d. From arrivals from home today, however, we learn that several brokers in London had been giving their opinion that the market would right itself very shortly after the new duty was fixed. The big buyers might play their game for a few weeks; but the balance would soon be regained and prices resume their equilibrium, on the higher plane created by the extra duty. For ourselves we do not foresee any long-standing danger to the tea-growing industry, following on the larger Customs levy. That there will come a period when the lowest of low prices will be reached and awhile maintained, we may well believe; but the tea industry has passed through worse crises before and should weather this as successfully as the rest.

INDIAN TEA ASSOCIATION: SCIENCE AND PLANTING.

Calcutta, 27th Feb. 1900.

Extracts of Proceedings of a Meeting of the General Committee held this day:—

Present:—Mr. H. C. Begg (Vice-Chairman), Mr. G. G. Anderson, Mr. W. Brown, Mr. G. Kingsley, Mr. G. A. Ormiston, Mr. M. R. Quin, Mr. A. Tocher, Mr. R. R. Toynbee, and Mr. T. Traill.

Scientific Officer.—Enclosed with Mr. Tye's letter, dated 9th February, was a copy of a letter dated 5th February from Dr. J. Augustus Voelcker, Consulting Chemist to the Royal Agricultural Society of England, regarding this appointment. In this letter it was stated that the gentleman selected by Dr. Voelcker for the post was Mr. Harold B. Mann, B.Sc. (Victoria University), F.I.C. Mr. Mann was formerly a student at the Yorkshire College, Leeds, and took his B.Sc. degree at Victoria University, (Owen's College, Manchester), with first class honours in 1892. He became Le Blanc Medallist in the same year. Mr. Mann subsequently gained a Research Scholarship of the Commissioners of the 1851 Exhibition and went to Paris, studying fermentation at the Pasteur Institute under Professor Duclaux. He had subsequently been employed by the Royal Agricultural Society of England. His appointment was strongly recommended by Dr. Voelcker. It was understood that the London Committee had appointed Mr. Mann to the post, and the arrangements to be made on his arrival were now considered.

Considered letter, dated 19th February, from Messrs. Duncan Brothers & Co., regarding the refusal of the Conference Liners to pay claims for loss or damage which occurs in their hands in the case of tea in metal packages. Messrs. Duncan Brothers & Co. considered that the Liners were not entitled to condemn all metal chests in this way, and they suggested that the point should be kept in view when the time arrived for any new Steamer Agreement. The Committee agreed with Messrs. Duncan Brothers & Co. that the Liners were not entitled to condemn metal chests in the manner indicated. They did not, however, see their way to take action beyond drawing the attention of the London Committee to the point in view of any future new agreement with the Conference.

Considered note, dated 10th February, by the Chairman regarding the provision of samples of Indian Tea for exhibition in the Economic Court of the Indian Museum. This subject was last referred to in the proceedings of the meeting of the Committee held on 1st August. The arrangement then suggested, whereby a representative collection of samples from the several Tea producing districts should be exhibited, had been carried out by the Committee. It appeared, however, from more recent correspondence with Dr. Watt, the Reporter on Economic Products to the Government of India, that this did not meet his requirements. He had informed the Chairman that he desired to have for the Court—(1) Samples from all, or as many as possible, of the gardens of the chief Agency Houses. (2) Tea chests of all descriptions—Country-made, Japanese, Swedish, &c. (3) Models of machinery of all available types. Dr. Watt

proposed to group the gardens of each Agency House together; and to label each sample with the names of its garden, and of the garden Agents.

Before taking any action in the direction of asking members of the Association to supply samples upon this system, the Committee directed the Secretary to ascertain from Dr. Watt an approximate idea of the number he had space for. They rather inclined to the opinion that the space required for samples from all the gardens of the chief Agency Houses might be greater than Dr. Watt anticipated.—*Indian Planters' Gazette*, March 3rd.

THE PROSPECTS OF TEA:

CONSUMPTION IN FOREIGN COUNTRIES. THE CHECK ON OVER-PRODUCTION AND LOW PRICES—? "A TRUST."

The London merchant, largely interested in Indian tea, whom we have already quoted, (see page 669) writes on 23rd February:—"I duly received your letter of 14th December written on board the 'Rome.' We can only await developments of foreign consumptions. There is no doubt whatever a tendency among certain French people, where they are brought into close touch with the English or are influenced by the fashionable tendency to ape English ways, to make use of tea; but the French are a very conservative people, and it seems to me that the tea habit is foreign to their ways and therefore unlikely ever to become a prominent factor in their national life. I have been in pretty close touch with the various movements made in the last twenty years by the Indian tea people to promote a greater consumption of tea in Paris, and so far I can only characterise the business as practically of no mercantile importance.

"As to the immigrants from the United Kingdom into the United States not having continued the traditions of their fathers, I must say I am not at one with you in tracing the reason for this. The climate to my mind explains a great deal, and the character of the tea consumed follows fairly well-defined geographical lines. In New England and all the older states there has always been a fair consumption of black tea, and the people there have followed the other Anglo-Saxon people in passing more or less gradually from one black tea to another, that is China has been displaced by the Indians and Ceylons. Japan tea has made its way largely from the western seaboard since the opening up of the various routes of trans-continental railroad, and it has made a business for itself quite independent of the old black tea trade. There is no doubt that some people in California and the States nearer the West may have been induced to drink Japan whose parents or who themselves, prior to emigration, had used old-fashioned China teas in the home country; but you must recollect that the consumption per head of tea in the old country fifty years ago was very low in comparison with the present figure, and more on a level with the present figure in the United States. You must bear in mind that the term English breakfast tea is merely an inclusive title for all black teas, and was in use as descriptive of China congo before any Indian or Ceylon teas were imported, and although the two latter teas have been gaining ground in America, it has been principally because of the displacement of China tea; and I must say I am doubtful whether there has actually been any increase of recent years within the United States itself in the use of black teas.

"As to Russian duty, your argument that a reduction in the rate would lead to the use of better,* tea is not justified by what has happened elsewhere. At present Russia consumes largely of the very finest tea the world produces. Canada, where there is no duty, and the United States, where the duty is recent and probably temporary, take the filthiest rubbish the law will allow to enter. Great Britain, where the duty is a very small one, takes lower and commoner tea all the time, the rage for cheapness and not for quality seeming to pervade the whole life of the people.

"The existing Associations in London of Tea Producers have so far achieved little but trouble. Had we not had a vast over-production of tea in both India and Ceylon many of the grievances that are made so much of, would never have been felt, and I think those Tea Associations would have served a much more useful purpose had they endeavoured to pass 10 years ago a self-denying ordinance as to increased acreage,† instead of checking things at the fountain head in that way, they have made repeated trouble for the distributive section of the trade whom they affect to regard as their natural enemies, while they really are their best friends. It is all very well to try to eliminate the middleman, and in the tea trade a good many such have been effectually abolished, so that producers and retail distributors are very closely brought together indeed now. What is the result? The powerful retailers are combining in a way that the old-fashioned dealers never could have combined, and I see very little hope for the future of tea production unless it is all forced into one gigantic Trust on the model of recent industrial developments in the United States."

COCHIN MARKET REPORT.

Cochin, 10th March.

C. N. Oil.—Some contracts were placed in the bazaar in the early part of the week at R87 to R87/8 per candy but latterly rates dropped and the market closes today rather weak at R87 with ready sellers for prompt delivery.

Coir Yarn.—A moderate demand exists for weaving qualities, for shipment to Europe. There is also some enquiry for shipment to Calcutta. Rates may be quoted at R35/60 per candy.

Coprah.—Rassi—R52/53 per candy.—*Ccchin Argus*, March 10th.

* Our idea was better Ceylon tea for the rich classes and a larger quantity of ordinary teas for the middle classes.—Ed. *T.A.*

† Our correspondent should remember that the worst sinner in this respect was a great proprietor or capitalist interested in Indian tea estates, who some years ago showed in print, a vast field for extending tea consumption in Europe and America, as justifying a large extension of planting in Ceylon and Southern India.—Ed. *T.A.*

CEYLON COCONUT PALM INDUSTRY AND EXPORTS:

PAST, PRESENT AND FUTURE.

In reviewing the exports of coconut palm produce for last year, we calculated that they represented a falling-off of the equivalent of about 59 million nuts, as compared with 1898; and that represented in value about 1¾ million rupees. We are not surprised, therefore, that the Horrekelly [Coconut Estates] Company, which declared a dividend of six per cent for 1898, was able to divide only five per cent among its shareholders for 1899. As good coconut property is believed to yield larger returns than are indicated by these dividends, we gather from the summary of proceedings sent to us for publication, that the Directors are to consider whether means cannot be adopted by better manuring, to increase the yield of the plantation. Meanwhile, we observe that there has been an improvement in the exports during the past two months; and we have been making inquiries to ascertain whether this improvement generally, can be expected to continue, with the result noted down as follows for the information of our readers.

In the first place, no safe deduction, can be made from the figures for the first two months of the year. The prices offered for nuts and copra at the end of last year were not such as to favour large transactions; and with the season of short crops on, holders were not in a hurry to part with what they had in hand. Then the South African War had a disturbing effect on trade generally, and on the freight market in particular. Much of the coconut produce sent forward, so far, this year probably represents last year's crop; and it will not be safe to calculate on a continuance of the excess over last year's figures which the export tables shew. The decrease last year, as compared with the previous year, was largely due to the two droughts in February-March and June-July, which told seriously on crops. But the effects of those rainless months are indicated only partially in last year's outturn of crop. This year's crops, too, must show a falling-off, as it takes almost a year for a nut to set and mature; and the effects of the June-July drought will be felt in the crops to be picked till the middle of this year. To add to the trouble, the North-East rains have been scanty, and complaints are rife of the severity of the drought now prevailing towards the Madampe and other coconut growing districts. Under these circumstances we fear, not only that no excess over last year's outturn of coconut palm produce is to be expected; but even that there will be a positive falling-off from the not too satisfactory exports of last year—unless young plantations just coming into bearing add materially to the year's outturn of crop. It is of interest to note the increase over last year which the exports for the past two and half months show. To take the figures up to 12th instant,—of coconut oil there has been sent away as much as 90,572 cwts, which is in excess of the quantity shown in any of the three years past, and nearly treble that for 1897. So with copra: 87,901 cwt is close upon double the figures for the last two years which witnessed a revival of the trade, and nearly nine times the exports for the corresponding period of 1897. High prices ruling for copra explain the rapid pushing forward of supplies. In desiccated coconut, however, there is a decrease of about 78,000 lb. compared with the same date (12th March) of 1899, when 1,781,790 lb. were sent off; but this quantity is 358,849 lb. less than that for 1898. Coconuts in the shell, too, for which high prices prevail, number over 1,872,000 against 1,120,000 exported last year, and nearly 1,733,000 in the year before. If our apprehension that this year's crop of coconuts will fall short of last year's crop prove true, better prices than last year's should prevail, if the demand, as is likely, continues brisk. —Since the foregoing was written we have cheering accounts of a break in the drought; but we fear much damage to crops has already been done, especially in the Northern Districts.

THE USE OF NETTLE FIBRE.

The American Consul at Glauchau (Germany) reports that nettle fibre has of late come greatly into favour in the manufacture of fine yarns and tissues. In Germany, there are factories which use these fibres both in spinning and also for ulterior purposes. In nettle-spinning alone, over 10,000 spindles and some hundred workmen are employed. The raw material is imported almost exclusively from China, whence 661,500 to 802,000 pounds are annually sent to Germany. Nettle fibre produces one of the finest tissues obtainable from any known kind of vegetable fibre, and in view of the importance which this seems likely to attain in connection with the weaving industries, it is intended to introduce the cultivation of nettles, if possible, into the Cameroons. The idea is to prepare the products of this experimental culture at the place where they are obtained, and test them in German factories. Should favourable results follow from these experiments, it is intended to organise nettle-growing enterprises on an extensive scale.—*Indian Review* March.)

Planting and the Indian Currency.—Mr. John Logan, in the *Madras Mail*, backs up Mr. R. H. Elliot as to the evil effects on planting (coffee especially) of the new currency. Here is the comparison:—

Land went up to fabulous prices, as high as R200 per acre being given at public auction for forest land. Prices were good and money flowed freely into the country, and the revenue went up by leaps and bounds. In the labour market, the demand was far in excess of the supply, which was scarce and dear. This happened before our Government began to tinker with the currency. What is the obverse of the picture now after we have had four or five years of a sound and stable currency? Prices of land and produce have gone down lower than they have been for years. I have seen good land sold at less than R5 per acre. Labour has been so plentiful that the best Canarese coolies have been driven from the door, and of course, is cheaper. The coffee industry in the hands of the natives has collapsed, while the voice of the rich sowcar is silent in the land.

ROEBERRY TEA CO. OF CEYLON, LD.

THE ANNUAL REPORT.

ACREAGE.

Tea in bearing	...	542 acres
Planted in 1896	..	127¼ „
Do. 1897	..	40 „
		709¼
Cardamoms	..	4
		713¼ acres in cultivation.

The Directors have now to submit their Fourth Annual Report and accounts, being those for the year ending 31st December, 1899. The yield of Tea during the period has been 179,176 lb. costing 30·32 cent per lb. as against 30·94 cents last year, and realizing 40·46 cents as against 39·94 for the same period.

On a reference to the accounts it will be seen that the sum at credit of Profit and Loss Account, including the sum brought forward from last year, is R9,541·15 after allowing for Depreciation on Factory and Machinery; and out of this sum the Directors recommend that a dividend at the rate of 3 per cent be declared, absorbing R9,000·00 leaving a sum of R541·15 to be carried forward to the current year.

Crop has again been short owing to excessive drought, the rains having been late in setting in after the dry season, but it is hoped, with increased plucking from the young Tea now coming into bearing, 200 000 lb. may be secured during season 1900.

Mr. W Sandys Thomas visited the Estates on 18th, and 19th December last, and found things generally in a satisfactory condition.

The retiring Director is Mr. E Hamilton, who is eligible for re-election.

The appointment of an Auditor for the current year rests with the meeting.

CEYLON PROVINCIAL ESTATES CO., LD.

THE ANNUAL REPORT.

The directors have the pleasure to present their Report for the ear ended 31st December 1899 together with a statement of Acconnts for the same period, which have been duly audited.

The season has been a favourable one for the growth of leaf, and the crop has amounted to 488,904 lh of Tea as compared with 430,951 lb last year. This is considerably in excess of the Estimate, and shows an average yield of 560 lb per acre in bearing.

Prices, too, have been well maintained, and the average is 44·62 cents per lb against 42·73 last year.

The cost of production has at the same time heen moderate and works out at 24·35 cents per lb which includes 2·25 cents per lh for expenditure on manuring oprations. Last year the cost was 26·10 cents including 1·50 cents for manure.

The Working Account closes with a surplus over expenditure of R103,221·09 as against R76,371·16 last year.

Out of this an interim dividend amounting to R19,980 at 3 per cent has been paid, and R15,000 has been absorbed in paying off £1,000 from the Glassaugh Mortgage in order to get permission to remove the Factory and Machinery from that division of the property to Aadneven where the new Factory for Glassaugh is now situated. Interest on Mortgages amounts to R9,900 15, and after providing for Bonus to Superintendents and other items, there is a final balance of R51,227·66 standing at credit of Profit and Loss Account.

On the other hand, it will be seen by the Balance Sheet that our liquid Assets, or available funds amount to only R33,887·03. The difference is accounted for by the capital and mortage money having been insufficient, to the extent of R17,340·63, to provide for the extension and improvements to property of late years.

The Directors recommend, therefore, that a final dividend of 5 per cent be declared, making a total of 8 per cent for the year. This will absorb R33,300, leaving R587·03 to be carried forward to next season, besides placing the above mentioned sum of R17,340·63 to Extension account which, with the capital and mortgage money, now equals the amount locked up in property, etc. It is to be observed, however, that, had it not been for the stipulation of the Glassaugh Mortgagee about the old Factory on that Estate, we should have been able to make a dividend of 10 per cent for the year, and something over.

The balance of £5,000 due on the Glassaugh Mortgage has been replaced by a new Mortgage for R75,000 resulting in advantages to the Company.

The Estates are reported to be in excellent order and although Blights have been prevalent at certain periods of the year, the crops show that their attacks have not, so far at all events, affected the yeld or impaired the vitality of the bushes.

The Estimates for the new season point to a yield of 455,000 lb of tea costing 26·70 cents to produce, and this expenditure includes a liberal allowance for manure and cultivation generally.

A fresh survey has been made of Brownlow, with the result as given below. Glassaugh has also been surveyed, but particulars have not yet been received.

		Glassaugh.		Brownlow.	
Tea in bearing	..	426½	acres	423	acres
„ partial bearing	..	34½	„	80	„
„ young	..	40	„	—	„
Total in Tea	..	501	„	503	„
Fuel Trees	..	—	„	2	„
Buildings &c.	..	—	„	7	„
Forest	..	14	„	33	„
Grass land	..	2	„	27	„
Scrub and Waste	...	15	„	13	„
Total	...	532	acres	585	acres

Mr. Anderson retires from the Board on this occasion in terms of the Articles of Association and is eligible for re-election.

The appointment of an Auditor for 1900 rests with the Meeting.

THE CEYLON TEA AND COCONUT ESTATES COMPANY, LIMITED.

THE ANNUAL REPORT.

ACREAGE:

TEA.—In bearing	..	265 acres.	
In partial bearing		165 „	
			430 acres.
Coconuts	.. ..	..	558 „
Rubber	.. ...	..	35 „
Grass, Forest and chena		..	213 „
Cinnamon	.. ...	..	21 „
		Total...	1,257 „

The Directors have now to submit to the shareholders the accounts for the past year.

TEA DIVISION.—The crop secured amounted to 78,933 lb., being about 29,000 lb. under the estimate which is accounted for by the very dry season that has effected most of the estates in the district, and part of the tea having been attacked by Grey Blight (though no permanent damage has been done hy it) necessitated the pruning down of about 70 acres, which was not estimated for. The nett average price realised was cents 36·43 against cents 37·34 in 1898.

COCONUT DIVISION.—This crop was over 200,000 nuts short of the estimate, entirely owing to the unusually dry season. The total crop gathered during 1899 was 541,912 nuts, of which 1,460 were sold on the estate at the average of R30 per thousand nuts. The remainder were made into copra—candies 421-0 2-8, and sold at a nett average of R44·20 per candy, as compared with 493 caudies in 1898 which realised an average of R44·76.

During 1899 the Directors considered it advisable to enlarge the withering accommodation of the factory, in consequence of the increased quantity of leaf anticipated this year, and for the same reason they have also purchased a new Rapid Roller and a large Down-Draft Sirocco.

The estimates for this year are. Tea, 184,000 lb. against an expenditure on working account of R42,518·50, which includes the purchase of 80,000 lb., green leaf from other estates. Coconuts,—600,000 nuts on an expenditure of R14,100. These estimates include R7,180 to be expended on manuring.

After making the usual provision for depreciation of buildings and machinery, the result of the year's working shows a loss of R5,993·30.

Messrs. W H Figg & J A Henderson having resigned their seats on the Board, Messrs. G H Alston & H Tarrant were appointed to fill the vacancies.

In terms of the Articles of Association, Mr. G H Alston retires from the Board of Directors, but is eligible for re-election.

The appointment of an Auditor for the current year will rest with the meeting

THE UNION ESTATES COMPANY OF CEYLON, LIMITED.

THE ANNUAL REPORT.

ACREAGE.

	Tea in full bearing.	Tea not in bearing.	Cocoa.	Cardamoms.	Total Cultivated.	Grass, Jungle and Waste Land.	Total.
Hayes Group	518	3	—	25	546	1,665	2,211
Dea Ella ..	248	—	91	—	339	147	486
	766	3	91	25	885	1,812	2,697

The Directors now submit to the Shareholders the accounts of the Company for the past year.

From the 1st September the Directors arranged for a four years' lease of Longford estate, which is 256 acres in extent, 142 acres of which are under tea. The terms arranged are that this Company undertakes to pay from time to time as they fall due, the assessments due by Longford estate for the construction of the Anningkande-Hayes road, which amount to R2,841·11, or say a little over R700 per annum.

This estate has for many years been managed by the Superintendent of Hayes and its tea manufactured at Hayes Factory at a price which left a fair profit to the Company. Had the estate passed into other hands this profit would have been lost, which at the above rental will still be earned by the Company.

The tea crops secured amounted to 82,330 lb. (including 18,332 lb. purchased leaf) on Dea Ella, 219,778 lb. on Hayes, and 12,963 lb. on Longford during four months, while 9,641 lb. and 32,469 lb. were manufactured for other estates. The average prices realized were 36 cents for Dea Ella and 38·65 cents per lb. for Hayes and Longford teas, which were sold together under the Hayes mark on an all round average of 37·96 cents per lb. as against 34·32 cents in 1898. The cocoa crop on Dea Ella amounted to 95 cwts., which sold at an average of R40·25 per cwt., while the small crop of Cardamoms from Hayes realized Re. 1·12 per lb. nett.

The road to Hayes Factory has now been opened for some time and has been of great service to the estate. The plant for electrical transmission of power to the factory has worked most successfully during the year.

After writing off to coast advance reserve account the sum of R1,500 as a provision for doubtful advances and the sum of R165·07 for bad debts, and transferring to depreciation account on the usual scale, the sum of R10,306·91, (which is equal to 3·22 per cent on the capital of the Company,) the nett profit for the year amounted to R11,456·76, equal to 3·58 per cent on the capital of the Company, To this has to be added the balance of R275·39 brought forward from last year and R86·71 surplus over estimated proceeds of crop unsold at end of 1898.

In view of the amount still owing to the bank the Directors regret that they cannot recommend the payment of a dividend, but would suggest that R10,000 be transferred to an extension fund account and the balance of R1,818·86 carried forward to the current year's accounts.

Capital expenditure during 1899 amounted to R8,268·57, of which R4,054·62 was expended on completion of electrical transmission installation and the balance on the upkeep of acreages not in bearing, and on necessary additions to Machinery and Buildings.

Crops for the current year are estimated at 366,000 lb. tea, 120 cwts. cocoa and 200 lb. cardamoms, on an expenditure of R111,855 29, while expenditure on capital account is estimated at R3,500, principally on upkeep of acreage not in bearing and the erection of new lines on Hayes Estate.

In terms of the articles of Association Mr. W. D. Gibbon now retires from the office of Director, but is eligible for re-election.

The appointment of an auditor for the current year rests with the meeting.

THE ESTATES COMPANY OF UVA, LD.

THE ANNUAL REPORT.

CREAGE:

	Tea in full bearing.	Tea in partial bearing.	Tea not in bearing.	Total Tea.	Other Products.	Timber, Grass, Forest and Waste land.	Total.
Dammeria Group	515	60	29	04	30	556	1190
Battawatte and Forest Hill	413	178	..	591	..	164	755
Gampaha	455	78	57	590	45	231	866
	1383	316	86	1785	75	951	2811

The Directors now submit to the Shareholders the accounts of the Company for the past year.

The crops secured were as follows, 530,695 lb. tea, 495 bushels coffee, about 143 lb. cardamoms and 54 cwt. cocoa. During the year 54,891 lb. tea were manufactured for other estates on Gampaha, while it was necessary, owing to want of withering space, to manufacture elsewhere 8,590 lb. of Battawatte tea. The new withering house on Battawatte is now completed and there is ample space to deal with the crops for some time to come. The cart road through this estate is now finished, and difficulties of transport are in consequence considerably lightened.

After writing off for depreciation of buildings and machinery on the usual scale the sum of R17,638·19 (equal to 2·48 per cent on the capital of the Company), and a small irrecoverable coast advance of R24·33, the profit for the year was R24,519·05, equal to 3·45 per cent on the Capital of the Company. There falls to be added to this the balance brought forward from 1898, R9,842 10, and a surplus of R43·89 over the estimated proceeds of produce unsold at the end of 1898. The Directors recommend the payment of a dividend of 3 per cent for the year, and that the balance of R13,090 04 be carried forward to the current season's account.

During 1899 the expenditure on Capital Account amounted to R29,753·03; the erection of the new withering house on Battawatte cost R15,581·34, the contribution on account of the construction of Forest Hill cart road amounted to R4,053·84, and the balance was expended on the opening of 15 acres on Gampaha, the upkeep of acreage not in bearing and on small additions to the buildings and machinery and erection of new lines.

The crops for the current year are estimated at 581,000 lb. Tea, 50 bushels Coffee, 60 cwts. Cocoa and 150 lb. Cardamoms on an expenditure of R181,417·85.

The expenditure estimated on Capital Account is R12,853 for upkeep of acreage not in bearing and additions to machinery and buildings.

During the past year Mr. W H Figg resigned his seat on the Board and Mr. F G A Lane was elected to the vacancy.

In terms of the Articles of Association Mr. G H Alston now retires from the office of Director, but is eligible for re-election.

The appointment of an Auditor for the current year will rest with the meeting.

UVAKELLIE TEA CO. OF CEYLON, LD.

ANNUAL GENERAL MEETING.

THE REPORT.

The Directors have now to submit their Report and Accounts for the year ending 31st December, 1899

The crop amounted to 152,660 lb. tea, costing 26 82 cts. per lb. against 138,995 lb, costing 30·82 cts. in 1898; the profit on the Working Account being equal to 9·30 per cent on the Capital of the Company.

After estimating the unsold tea at a safe figure, the crop has realized 41·67 cts. per lb. against 45·10 cts. in 1898.

After paying an interim Dividend of 3 per cent and writing off 7½ per cent for Depreciation on Buildings and Machinery, the profit amounts to R12,287·30, and the Directors recommend that this amount be disposed of as follows:—

That a final dividend be paid of 4 per cent (making 7 per cent for the year) absorbing ..	R9,600·00
That a sum be carried to Reserve, of	2,000·00
That a Bonus be paid to the Superintendent, of	500·00
and that the balance of .. ... be carried forward.	187·30
	R12,287·30

The Estimate for the current year is 155,000 lb. tea to cost R47,045·16.

In terms of the Articles of Association Mr. W D Gibbon retires from the Board, but being eligible, offers himself for re-election. It will also be necessary to appoint an Auditor for 1900.

BRAZIL COFFEE NOTES.

The continued rains throughout the coffee districts have greatly benefited the growing crop. The ripening of the fruit from the abnormally early flowering is being delayed, and the general condition of the crop is said to be much improved.

Telegrams from Paris on the 23rd and 24th state that the French government will impose double duties on Brazilian coffee, should this country impose special duties on French products. A tariff as destructive to the interests of both countries, would therefore appear to be imminent.—*Rio News*, Jan. 15.

PLANTING NOTES.

THE "AGRICULTURAL LEDGER."—1899—No. II. Xylia Dolabriformis. (Iron-wood of Pegu). A Revision of the article on that subject as given in the Dictionary of Economic Products, with special reference to the timber, and the employment of the refuse wood as a tanning material. —received.

JAVA TEA.—An Amsterdam circular by this mail gives the total sales of Java tea there during 1899 at 5,293,770 half.kilograms (1 1-10 lb.) at an average of 37¾ cents (of a florin) per half-kilogram. This is equivalent to 5,823,147 lb. and the average to about 34¼ cents, or say a little over 8d, per lb.—The imports in 1899 seem to have been rather less than in 1898. A certain quantity is still taken of "China tea": a merely trifling quantity of "British-Indian" tea.

TEA PLANTED AND EXPORTS.—Our figures in article on page 697, require a little supplementing, in order to make the comparison more instructive. In 1888, of 183,000 acres planted, about 81,000 would not be in bearing or under three years; in 1893, of a total of 273,000, about 53,000 not in bearing; in 1899, of estimated area of 375,000 acres, say 45,000 acres not in bearing.

CACAO PROSPECTS.—In his report on the London market (see page 676) Mr. Hamel Smith speaks of "increasing cultivation in Africa' which will give crop this year sufficient to cover an increasing demand. Now, we should like to know more exactly where cacao cultivation is being systematically and extendingly carried on in Africa? There may be a very little in Nyassaland, Uganda and German Eas Africa; but we take it the West Coast is meant; and yet we cannot suppose Congo land, or any British dependency is seeing much cacao planted?

PARA RUBBER.—Exports of rubber from Para were valued at £7,600,000 for 1897 and £7,7000,000 in 1898. For 1899 they are likely to have reached £8,000,000 or about £14 per head, a rate equalled but by very few other countries and probably excelled by none—not even the Australian colonies or Uruguay. The *Brazilian Review* remarks:—In a country that produces so much with so, comparative, little labour there must be plenty of money to spend and even to waste. So if there are any young and enterprising men in search of a Golconda so long as they don't mind the heat or a little feverishness they can't do better than try Para and if they don't make their pile it must be because they "have not the method of making a fortune."

TEA CROPS AND THE INCREASED TEA DUTY.—Says "*Indian Gardening*":—"Any fear of the future could only arise from an increase in production, which we see no reason to apprehend. In the year just past the exceptionally favourable season in Cachar, Sylhet and the Dooars accounted for the unexpected increase in production, those districts being responsible for nearly the whole of the eleven million pounds of surplus. But the fact that the last season was an exceptionally favourable one relieves us from the anxiety that the districts named will again improve on these figures. They will do well if they equal them. Assam has been practically stationary for the last two seasons at 62 to 64 million pounds. Her estimates have been accurate and we may accept them. The other districts may be disregarded; they cannot do very much towards upsetting the figures. Therefore we think there is every reason to conclude that the Indian tea crop has reached its limit for the present, and the increase of the duty will no doubt make planters chary of extending cultivation or entering upon any operations which will increase the load on the British market. At present figures we may consider ourselves safe. Ceylon, we notice, has estimated for an increase of 8,000,000 lb., which they trust to work off. It is possible that the increased duty may interfere with their anticipation, and we trust that their foreign markets propaganda will be unusually successful to relieve the British market of their surplus."

AN ELEPHANT INQUEST IN LONDON.

Last Sunday afternoon (Feb. 18), while a concert was being held at the Crystal Palace, an elephant belonging to a circus which had been performing there broke from its fastenings and killed its keeper. It then brushed through various partitions of wood and glass, and appeared in the main building, where a great number of persons were listening to the music. It did not attempt to hurt any of the crowd, though it broke off with its trunk the uplifted arm of a statue, probably under the idea that this represented a man about to strike. After some time it allowed itself to be secured by another elephant. It was then decided to kill the animal, and after a dose of poison had failed, a London gunmaker was sent for as executioner and shot the animal dead.

On the following Wednesday an inquest was held on the body of the man. If it had been one of the trials of animals held by jurists in the middle Ages for the exhibition of legal subtlety, the evidence in favour of the elephant could not have been more clearly put. Mr. Sanger, its owner, admitted that the animal had once before killed a former keeper; and he gave the facts which led to the death of the second. The facts speak for themselves. The first man had been discharged by Mr. Sanger fifteen months previously for gross brutality to the animals. He came back and asked to be employed again. This was granted, and he was taken on, not as a keeper, but as a labourer. The very first time he went into the stable the elephant, though it was quite dark at the time, instantly recognised the man's voice and

AT ONCE CRUSHED HIM TO DEATH

against the stall. That the creature had acted only in a panic of horror at the reappearance of a tormentor was so well established at the previous inquest that it was retained in the menagerie. It was exceptionally docile, and was taken through towns and villages all over England. Why then did he kill the second keeper? Because this man, after his Sunday dinner, declared that he would "pay out" the elephant for striking him with its trunk. He actually took a lance, one of those taken from the Arabs in the Soudan. (Those who have seen the trophies taken from the Mahdi's followers, now kept in the United Service Institution, will realise what a horrible weapon this was.) Followed by another keeper also armed with a lance, he proceeded to "prod,' —*i.e.*, pierce the chained elephant. The tortured creature after backing as far as it could, "at length rushed forward to escape the lance, broke its chains, threw down the keeper and trampled on him." If the elephant had been a man and had been put on his trial afterwards, would it be too much to anticipate that the verdict would have been one of justifiable homicide? All these facts, it is worth remembering, were sworn to on oath, They leave a very unpleasant impression as to the management of the "elephant herd" in this country. It is perfectly clear that the animal was in each case influenced by resentment caused by the cruelty of one individual. Male elephants, apart from their occasional attacks of frenzy, are not as unaccountably docile and submissive as the females, and most accidents which do occur in their long lives are due to the gradual forgetfulness of this difference of sex and temper by men who are so accustomed to witnessing the unhesitating obedience of the one that they make too great demands on the forbearance of the other. At the present time the Indian Government, with the exception of a few males kept for parade, only employs female elephants for this reason; even so it is believed that the pay or pensions of mahouts is calculated with reference to the conviction that they pursue

A DANGEROUS TRADE.

The native princes, on the contrary, keep male elephants in large numbers for purposes of State, and it is among the attendants of these animals that "accidents" most commonly happen. Experience, as well as common report, which declares that every elephant kills a mahout in its lifetime, shows that in far the greater number of cases the person attacked is the animal's own attendant. This at first sight seems a contradiction to the general behaviour of animals in captivity, or even in domestication. Generally speaking, they are specially attached to the person who feeds them and gives them exercise, and if disposed to be savage, vent their anger on strangers. There are a few instances on record of horses attacking their grooms, but this, as a rule, is only because the attendant happened to be the only person near when the animal was in a bad temper. The only domestic animals which habitually attack their attendants are the bulls kept for stock-breeding in England, which are responsible for most intentional homicides caused by animals in this country.

The grounds for the ill-will which the elephant often harbours towards its Indian mahout lie partly in the animal's temperament, partly in the character of these men. As most elephants behave with propriety to their drivers, we must believe that either the greater number of the mahouts do their duty by the beasts, or that the latter are exceptionally forgiving. But there must be more than mere hearsay in the general belief that the mahouts commonly steal and appropriate a very large part of the elephant's allowance of food, that they are in consequence often half-starved and hungry, and that the men use their steel-hooked and spiked "ankus" in a very merciless way on animals which are often not in condition to do the work which is set them. As the

COST OF AN ELEPHANT'S KEEP

is from £4 to £8 per month, in proportion to the food given him a proportion and quality which is fixed in reference to the work to be done, the margin for stealing is very great, being reckoned between the minimum necessary to keep the animal alive on low diet, and that required for keeping him in fine condition on the march in a campaign, when he is allowed extra rations, and even a bottle of rum per diem. No other animal is clever enough to know that overwork and underfeeding are probably caused by the direct agency of the man who maintains him. But it is pretty certain that the extraordinary intelligence of the elephant does enable it to put two and two together, and to conclude that the person who gives him little food ought not to punish him for not being up to his work. In any case the elephant bears no gratitude to the man who, if he can, gives him starvation rations, and is his daily slave-driver; and as long as native usage holds that "the driver and three generations of his family shall live on the beast he is paid to nourish" it must be expected that the animal will occasionally try the experiment as to whether the next generation can possibly be worse than its present tormentor. It is sometimes forgotten that an elephant may live for seventy or eighty years, or even longer, in the service of man, and that in the unchanging East he may, through this long life, be farmed as

a kind of property by the same family of mahouts; that the brutality of the father, if he be a brute, is learnt by the children and grandchildren, and that, if the wretched elephant is in bad hands, he has to put up with practically two of our working lives of ill-treatment and semi-starvation. The wonder is, not that its temper occasionally goes amiss, but that it does not "break out" oftener. The inference is that the *natural* temper of the elephant is almost the best and most easy going of that of any beast. All Hindoo traditions and folk-lore agree in this. The elephant is the type of *bonhomie* and easy geniality. It is this belief which encourages its "public" to take liberties with it on which they would venture with no other animal whatever. Perhaps the gentlest of our giant domestic animals are the big shire horses. But no one would expect them to lie down on being pressed with a sharp-pointed goad, or to do work on insufficient food, when ridden and managed by a creature no longer in proportion to their bulk than a monkey, armed with a sharp and painful weapon. Yet the shire horse has no memory for injuries and is at least as docile in his way as the elephant.

There is no doubt that the

POWER OF MEMORY

which the elephant possesses beyond all other beasts, and of reasoning, in which it is supreme, makes its ill-treatment especially dangerous, a danger which is only mitigated, but not removed, by its good nature and extreme patience. Though no one imagines that our English elephant herd is half-starved by the white attendants there is no doubt that these men do not infrequently incur the ill-will of their charges. By long familiarity and constant control the men gradually forget that the creature has a will of its own, and that it has both memory and a power of resentment. They also seem to lose all consciousness of the enormous strength of the beast they manage. Many of the men come to regard them as being as much under control as a traction engine, which only needs the turning on or off of taps to make it advance or recede. As a rule, their only instrument of discipline is a whip; but with this and plenty of shouting and scolding they can "get on the nerves" of an elephant very effectively. In a circus, and it is always in circuses and travelling menageries that these accidents occur, the men who attend the elephants often ride them in performances, and make them perform tricks. A good deal of hurry, some roughness, and occasional punishment are inevitable in these performances, all of which the animal carefully remembers. One day it has a fit of temper, or turns sulky—they will sulk for hours—and then the keeper is attacked. Circus elephants have also a trick of killing people "accidentally." By a movement backwards, or to one side, they will quietly jam a man up against the wall of a stable or a shed. One of the elephants at Olympia did this some years ago, and the first keeper killed by "Charlie" met his fate in this way. It should also be remembered that the elephant is one of the most nervous of all beasts, that one at the Zoo died of sheer fright caused by a thunderstorm, and that a highly nervous temperament of this kind may easily be worked into a frenzy by excitement following ill-treatment. But this is not the fault of elephant temper.—*Spectator*, Feb. 24.

CINNAMON: THE LONDON QUARTERLY SALE.

The news to hand by mail touching the first quarterly sale of cinnamon this year in London must be very cheering to proprietors of estates. While tea is having its weekly ups and downs, cinnamon seems to be holding its own, if not actually forging ahead, notwithstanding unprecedentedly large shipments. During a visit of a couple of days to the Southern Province and a drive of some 20 miles in the country inland between Galle and Dodanduwa, we were greatly surprised to see how freely cinnamon cultivation is being maintained and extended; and the experienced manager of Baddegama assured us that an annual rent of from R25 to R30 an acre can now be got for cinnamon gardens which perhaps had so far not cost more that R50 in outlay per acre. We saw, when reviewing the exports for last year, what immense strides the spice had taken, both in quills and chips, excluding altogether from consideration the wretched fraud separately catalogued as wild cinnamon; and we expressed a natural fear lest heavy shipments coupled with the disturbance which adulteration and spurious spice might create, might lead to a fall in prices. That our apprehensions were rather wide of the mark, we learnt by wire three weeks ago, when a steady market with better prices for fine qualities, and a slight fall for inferior bark, was reported. The information brought by the mail is even more satisfactory than the commercial telegram foreshadowed.

The quantity of plantation spice offered was 1,650 bales, or about the same quantity as in February last year, when the catalogues showed 1,649 bales. We regret to find this comparison omitted in the Report we append; but the usual form has had to be varied in more particulars thon one. The natural objection of shippers to their carefully made up bales being undone in London, and rebaled at two or three times the cost of sorting, baling and stencilling here, has led to a great deal of cinnamon being described in the catalogues as "unworked" in London. A further distinction has had to be introduced between "plantation" and "wild" spice; and to find space for these changes, there have been omissions, which we regret, in particulars referring to previous sales. The Report which we published last December on the November auctions, did not distinguish between plantation and wild spice, but merely informed us that the offerings were 4,450 bales of both sorts—an unprecedentedly large catalogue. Of this immense quantity, the proportion of genuine spice was by no means small; and although as much as 1,200 bales of this were cleared in the room, the tone of the sales was reported dull. It is not a little then that, with a full average quantity, the sale last month should have gone off well, the leading marks fetching late rates, and "A S G P" realising exceptionally high prices. This mark represents Golua Pokuna Estate in the Kadirane District, whose produce, under excellent management, has always topped the market; but from 1s 6d to 1s 9d per lb for the first three qualities is

quite a record, and must recall old times. Last November, when "worked" cinnamon of fine quality was in small supply, 1s 5d to 1s 8d were the highest prices, and they were satisfactory; while in February, 1899, the prices were 1s 2d to 1s 5d. So that the figures obtained last month may well be described as exceptional. Nor had "unworked" spice cause to complain, considering the fullness of the offerings. The prices they realised, and the quantity that found buyers in the room, point to the continuance of the demand for good honest spice, as heavy sales are frequently effected after the auctions. Even more satisfactory than the top prices obtained for fine bark, is the news that there was no demand for what is aptly described as "wild rubbish." The last was the second public auction at which wild cinnamon (if such it is) was neglected; and we trust soon to hear that there has been a cessation of disturbing shipments of what is veritable rubbish. How anything fetching 1½d to 1¾d per lb can pay shippers, we fail to see; but care will have to be taken by local buyers that "wild" spice, failing to command a market as such, is not mixed with plantation spice, and an outlet be found for it in that way; It is to be noted that, though the Chamber of Commerce gives no quotation for wild spice, exports have not altogether ceased yet, and last week saw a shipment of chips to the United Kingdom.

We quote as follows from the Report of Messrs. Forbes, Forbes & Co., Ltd. on the February sale:—

CINNAMON.

London, 27th February, 1900.

The first series of public auctions of the year took place yesterday, when about 1,650 bales Ceylon plantation were offered, together with about 1,500 bales wild Ceylon, and a large quantity of low bark &c. The supply of plantation quill was in excess of demand, about half only finding buyers.

The "worked" spice 150 bales met good competition, and the leading marks averaged late rates, except the fine quill A.S.G.P. in estate mark, some lots of which realised exceptionally high prices. The 1,500 bales "unworked" ordinary to medium sorts met a fair demand, some 700 bales being sold at prices, on the whole rather in favour of buyers. "Worked" firsts 1s 5d to 1s 9d; seconds 1s 3d to 1s 7d; thirds 1s 1d to 1s 6d; fourths 8½d to 11½d per lb. "Unworked" firsts 9d to 1s 2d; seconds 8d to 11½d; thirds 6d to 11d; and fourths 4d to 9½d per lb. For the "wild" rubbish there was no demand, a few bales only being sold at 1½d to 1¾d per lb. Of 4,600 packages wild bark, and chips about 1,700 bags sold, wild at 1d to 1½d; middling to good chips 2¼d to 4d and quillings up to 10½d per lb.

Stocks of Ceylon 4,109 bales against in 1899 5,239; in 1898 4,193 and in 1897 2,700 bales. There are 2,871 bales of "wild" Ceylon in warehouses. Of wild chips bark &c., 10,067 packages, and ordinary chips 2,736 bags.

The next sales will be held on 28th May.

Planting in the Cape Colony.—The Forestry Department is undertaking the planting of Conifers for timber. At present a quarter of a million is annually paid for imported wood, mostly coniferous.—*Gardeners' Chronicle*, Mar. 3.

SALE OF ESTATES.

PITA RATMALIE GROUP OF ESTATES, HAPUTALE, PURCHASED BY CEYLON TEA PLANTATIONS CO., LTD., FOR £40,000.

The name of Colonel Lillie was "familiar as a household word" among the early proprietors of estates in Ceylon. Like so many other military officers on the spot, he in the "thirties" and "forties" picked up some choice land between Kandy and Ramboda: but he also later, through his agents, secured a very valuable block in Haputale which became known as the "Pita Ratmalie and Pitarat Lillie estates," covering 1,603 acres in all. The management was for many years in the hands of "Dick Wyllie" and latterly of Mr. A. L. Kirk. Of course, the worthy proprietor, Colonel Lillie, has long been dead and his property out here has been held by trustees, for whom Messrs. Geo. Steuart & Co. are agents. Besides the Haputale estates just sold, they still hold Nayapane estate in the Pussellawa district.

It is an extensive investment, the purchase money being stated at £40,000 and will afford scope for some of the reserve money of this prosperous Company. The bargain would seem to be a good one for the Company, even if the large area of coffee is not regarded as a stable industry; for the total figures are given as follows:—

Tea	..	...	466 acres.
Coffee	..	..	294 ,,
Grass and Timber		..	35 ,,
Jungle	..	..	808 ,,
	Total	..	1,603 acres.

The tea is very good, and the large reserve of jungle is described as of fine soil, high elevation (5,000 feet and upwards) and most of it well sheltered, so that it alone ought to be worth a considerable proportion of the purchase money. If the coffee is in good heart and can be kept up by liberal cultivation and attention to enemies (now chiefly "bug" we suppose) the purchase may at once give some good crops to the Company. In any case this transaction indicates much confidence in the future of our staple, tea, and of high-grown tea in particular. We congratulate Mr. H. K. Rutherford, as Managing Director of the C.T.P. Company, on this latest addition to its properties.

Experiments in the Growth of Sugar Beet.—At a recent meeting of the Sugar Beet Committee of the Central Chamber of Agriculture, Colonel Victor Milward, M P in the chair, it was decided to make arrangements for a series of not less than 20 experiments in the growth of sugar beet in different parts of Great Britain and Ireland during the forthcoming season, each experimental plot to be at least one acre in extent. It is proposed that of the 20 experiments about 12 should be in England, four in Scotland, and four in Ireland. As in certain cases previous experiments have demonstrated the value of sugar beet for the feeding of stock, independently of the value of the root for the manufacture of sugar this point will be specially kept in view in connexion with the proposed experiments of the present year.—London *Times*, Feb. 23.

Correspondence.

To the Editor.

TEA CULTIVATION AND MANURE.

DEAR SIR,—Where do you get tea estates upcountry formed out of "virgin soil" except perhaps "High Forests"? There can only be about *100* acres of such *soil* on Loolecondera. It was, as a whole, long before planted in coffee.* In the lowcountry, of course, there are estates that fulfil these conditions and have been some time now in tea—sixteen years at any rate—such as Kanangama in Dehiowita, in the Kelani Valley. Mr. Taylor of Loolecondera, told his friends, of whom I was one, that manuring only gave increased crops in the ratio of what the land naturally gave when first opened. An estate that never paid from its commencement without manure, would never pay by the application of manure, for such application would be costly and give no remunerative return. *Ex nihilo nihil fit.*

My impression is, and I know it is shared by others, that tea planted in new clearings now, with the best seed available, does not give so quick or so good returns, as young tea planted, say ten or twelve years ago.

It is quite possible that Mr. Fraser's imitators will not get the same returns from their manuring as he did—though no doubt he will give them the best advice possible—because he commenced manuring trees that had been planted with tea seed in its prime, and the atmosphere was not poisoned by the immense area of tea now planted all over Ceylon taking up the same ingredients in their cultivation and throwing out the same excreta and gases.

I met an intelligent planter the other day, who told me that he had been recommended to bury his prunings, because by leaving them on the surface he lost in three prunings what could only be given him by an ordinary manuring. He said: "Well, my estate soil is alive with white ants. They will soon eat all my prunings and migrate elsewhere: don't they take the chemical ingredients of my prunings with them, and may they not in the laboratory of their stomachs evolve poisonous excreta that will produce some beastliness on my tea that may affect its price, or my bushes that may affect the bearing?" "My dear friend," said I, "get Mr. Bamber's opinion on the subject; let him analyse your prunings, your white ants, previous to and after gorging on your prunings, and mention my name, so that the fees you will have to pay the worthy Analyst will be credited against my guarantee."

Is it the case that the wily planter, now that he has from the P.A. in Mr. Kelway Bamber's pamphlet the analyses of the soils on typical estates and Mr. Bamber's prescription for the manure needed for such estates, is quite satisfied to use such manure, and so Mr. Kelway Bamber's "occupation is gone" as a soil analyst? ! OLD HAND.

[Surely "Old Hand" will admit that the whole of the tea in the Nuwara Eliya and Kandapola districts was planted direct on forest-land—so with a great deal in Upper Dimbula, Upper Dikoya and Maskeliya, and what about Balangoda? In fact, there are few districts, even in the Central Province, where some reserves of "forest" have not been planted within the tea era.—ED. *T.A.*]

* The old tea on Loolcondera, to which reference only is made, always means the 100 acres field.—ED. *T.A.*

THE NEW TEA DUTY AND PLANTERS.

DEAR SIR.—So 2d. extra tea duty is to be our war burden. The producer can ill afford it, let it be shared by the consumer and the dealers. Instead of manuring let the growers allow to lie fallow for a year a quarter of the cultivated area, and we shall then bring down on their bended knees, the wily blenders and mammoth dealers. Knock down our export 20,000,000 lb. instead of raising it 30,000,000 by manure and 10d will be the Ceylon average.—Yours truly,

TEA FARMER.

[Most satisfactory of results; but who is to nock down the export—or rather the "manuring"? "Who will bell the cat" by declaring who may, and who may not indulge in Manure? !—ED. *T.A.*]

THE NEED OF ADVERTISING ALL ESTATES FOR SALE.

Upcountry, March 16.

SIR,—How is it that the fact of large estates in Ceylon being for sale is sometimes, kept so quiet, in place of being generally and freely advertised? We all remember Lipton's great bargain in getting poor Downall's estates from Messrs, Antony Gibbs by private negotiation, for £25,000—when, had the places been advertised, there were those in Ceylon at the time who could raise £30,000 or more to secure so fine a group. Now it is another Haputale group sold for £40,000 and I have heard one gentleman at least, who could easily have paid the amount, say "A very good bargain—had I known of the places being for sale, I should certainly have made an offer"—and perhaps a better one!—Your truly,

PUBLICITY.

RAINFALL RETURN FOR COLOMBO.

(*Supplied by the Surveyor-General.*)

	1895.	1896.	1897.	1898.	1899.	Av of 30yrs.	1900.
	Inch.	Inch	Inch	Inch	Inch.	Inch.	Inch.
January ..	5·00	2·92	3·81	2·32	6·98	3·22	3·72
February ..	0·81	0·35	1·68	1·98	2·78	1·93	0·63
March ..	1·84	5·64	3·66	4·21	0·88	4·78	0·76*
April ..	9·34	5·93	10·97	22·81	6·66	11·31	
May ..	10·09	9·31	8·30	5·80	17·73	12·09	
June ..	13·99	8·37	10·14	10·94	9·23	8·37	
July ..	0·52	2·85	5·24	6·15	1·11	4·38	
August ..	0·92	6·35	9·09	0·97	0·62	3·67	
September	4·09	10·99	4·58	6·90	1·48	5·01	
October ..	30·36	16·78	4·71	20·60	12 99	14·52	
November..	5·83	19.81	11·66	17·38	8·58	12·66	
December..	9·44	11·76	8·89	3·05	4·44	6·39	
Total..	92·23	101·06	82·73	103·11	73·48	83·33	5·11

* From 1st to 28th March 0·76 inch, that is up to 9·30 a.m. on 29th March.—ED. *T.A.*

Ceylon Rainfall.

The P. W. D. Meteorological Observations of Feb. 1900.—We append the Monthly Return of rain from which it will be seen that the highest fall in February, was at Haldummulla in the Uva Province, 9·90 inches and the lowest at Madawachchiya in the North Central, and Ambanpitiya in Sabaragamuwa, 0·03 inches.

Western Province.

Negombo, Mr. Bucknall (6) ... Nil
Kalutara Mr. Gregson (36) ... 2·80
Labugama, Mr. Bond (369) ... 5·19
Henaratgoda, Mr. Silva (33) .. 1·16

Central Province.

Katugastota, Mr. Morgan (1,500) ... 0·71
New Valley, (Dikoya) Mr. Ward (3,700) .. 2·44
Helboda (Pussellawa) Not received (3,300) .. —
Yarrow Estate, .. Mr. Peto (3,400) ... 0·72
Peradeniya Mr. ... MacMillan (1,540) ... 2·16
Duckwari, Mr. Edwin (3,300) ... 0·37
Caledonia, Not received (4,273) .. —
Pussellawa, Mr. .. Powell (3,000) .. 0·50
Hakgala, Mr. .. Nock (5,581) ... 0·97
S. Wanarajah Estate, Mr. Tatham (3,700) .. 3·70
Padupola, Mr. Ward .. (1,636) ... 0·44
Mylapitiya, Mr. Fletcher (1,707) ... Nil

Northern Province.

Mullaittivu, Mr. Sanmukam (12) .. 2·00
Jaffna Mr. Kretser (8) Nil
Mankulam, (N. Road) Mr. Walker (167) ... Nil
Elephant Pass, Mr .. Silva (7) .. Nil
Vangalachettykulam, Mr. Oorloff (179) .. Nil
Point Pedro, Mr. Ropes (24) ... Nil
Jaffna College, Mr. Cooke (9) ... Nil
Kayts, Mr. Kretser .. (8) .. 0·07
Kankesanturai, Mr. .. Pararachasingha (10).. Nil
Pallai, Mr. Silva (24) .. Nil
Murikandy, (North-Central Road) Mr. Silva — Nil
Nedunkeni, Mr. Sanmukam (122) ... Nil
Chavakachcheri, Mr. Silva (16) ... Nil
Udupiddi, Mr. Hastings (35) .. Nil
Marichchukaddi, Mr. Thamotharampillay (14) 0·65
Murungan, Mr. Ramalinkam (52) 0·87
Vavuniya Mr. Walker (318) Nil

Southern Province.

Ella Vella Mr. Caldicott (262) 9·07
Kekanadura, do (150) 4·08
Denagama, do (286) 4·90
Udukiriwila Mr. Lourensz (235) .. 1·69
Kirama, Not received (260) —
Hali-ela Mr. Caldicott (200) 7·40
Tissa Mr. Peries (75) .. 0·78
Matara Mr. Caldicott (15) 2·05
Dandeniya, do (157) .. 1·54

Urubokka, Mr. Caldicott (800) Nil
Tang lla Mr. Fox (94) .. 1·43
Mamadola, Mr. Cade (56) .. 0·56

Eastern Province.

Irrakkamam, Mr. Bower (42) ... 7·70
Devilana, Mr. Vanderstraaten (136) 2·00
Sagamata, Mr. Bower (40) ... 2·45
Ambare, do (65) 5·74
Kanthalai, Mr. Carte (150) 0·53
Allai, Mr. Carte (95) 1·20
Rukam, Mr. Vanderstraaten (120) ... 3·20
Periyakulam, Mr. Carte (20) ... Nil
Chadaiyantalawa, Mr. Edge (57) 4·26
Kalmunai, do (12) 1·30
Rotewewa, do (30) 2·72
Lahugala, do (70) 1·20
Naulla, do (30) 2·36
Andankulam, Mr. Carte (41) ... 0·53
Manalpuddy, Mr. Vanderstraaten (21) 3·30
Maha-Oya-Tank, Mr. Vanderstraaten (190) 6·14

N.-W. Province.

Magalawewa, Mr. Dassaueiyake (176) .. Nil
Maha Uswewa tank, Mr. Crabbe (160) ... Nil
Tenepitiya, Mr. Churchill (8) ... 1·30
Batalagoda, Mr. Madakapola — Nil

N.-C. Province.

Kalawewa, Mr. Emerson (268) 0·50
Maradankadawala, Mr. Emesron (443) ... 1·69
Mihintale, Mr MacBride (354) .. Nil
Horowapotana, Mr. MacBride (217) . 0·70
Madawachchiya, Mr. MacBride (285) .. 0·03
Topare, Mr. Jayewardane (200) .. 0·73
Minneriya Mr. Eves — 0·87

Uva Province.

Bandarawela, Mr. Tocke (4,000) .. 1·43
Haldummulla, Mr. Viramuttu (3,160) .. 9·90
Kumbukan, Mr. Devasagaiu (446) ... 0·17
Koslanda, Mr. Rowland (2,258) ... 3·84
Tanamalwila, Not received (550) .. —
Bibile, Mr. Silva (680) 6·12
Taldena, Mr. Fernando (1,100) .. Nil
Allutnuwara—Mr. Leembriggen (3,0) 2·39

Sabaragamuwa.

Ambanpitiya, Mr. Dassanayaka (729) 0·03
Pelmadulla, Mr. Clarke (408) 7·95
Kolonna Korale (Hulanda-oya) Mr. Dabre (203) 1·53
Avisawella, Mr. Jeffery (105) — 2·80

S. G. O. Meteorological Observations for November, 1899.

The following is the return of the total fall of rain for November, from which it will be seen that the highest fall was at Kobnella Estate, Rangalla, 24·00 inches, and the lowest at Sandringham, Agrapatana 3·80 inches.

Colombo (40) 8·58
Ratnapura (81) 14·23
Puttalam (27) 11·09
Anuradhapura (295) 11·33
Mannar (12) 16·11
Jaffna 9 9·23
Trincomalee (12) 14·99
Batticaloa (26) 16·92
Hambantota (50) 5·70
Galle (48) 6·80
Kandy (1,654) 4·88
Nuwara Eliya (6,188) 5·96
Hakgala, Nuwara Eliya (5,581) 9·08
Badulla (2,225) 9·97
Kurunegala (381) 4·66
Maligakanda, Colombo Mr. Johnson (70) 6·91
Agricultural School — Colombo, Mr. Rodrigo ..
Passara Hospital, Passara (Mr. Thomasz) 2 200 8·33
Welhelmina, Puttalam, Mr. Ratnayeke (131) ..
Horakele Estate, Chilaw, Mr. Beven (50) 4·70
Chilaw Kachcheri Chilaw, Mr Koch (10) ...
Franklands Estate —
Veyangoda, Mr. Beven 8·13
Orange Hill, Ragama Mr. Bury (50) 15·80
Henaratgoda Gardens, Henaratgoda, Mr. de Silva (33) 15·52
Kotua Godella, Rambukana Mr. Windus (580) ..
Eadella or Liberia Estate Polgahawela Mr. Craighead (425) 4·93
Geekianakanda, Neboda Mr. Towgood (200) ..
Polgahakanda, Neboda Mr. Wight (300) 11·37
Labugama, Hanwella, Mr. Bond (369) 15·69
Rayigam, Horana, Mr. Dawson, (300) 7·97
Kanangma, Avissawella Mr. Cooke (200) 8·88
Dunedin Estate, Avissawella, Mr. Bayley, (400) 10·05
Digalla Avisawella, Mr. Tottenham, (400) 6·50
Pamhagama, Avisawella, Mr. Bridgman (600) 9·63
Avisawella Estate Avisawella Mr. Byrde (250) 13·83
Yatideriya, Kegalla, Mr. Fairweather — 9·01
Mahawalatenna, Balangoda Mahawalatenna R M. -- 5·55
Agarsland Estate Balangoda Mr. Boyd (2,?15) ..
Maduwanwala, Rakwana, Maduwanwela R.M. (750) 7·24
Anninkanda, Morawaka, Mr. Anderson, (1,400) 12·66
Panilkanda, Morawaka, Mr. Davidson. (1,900) 9·88
St. John Del Rey, Bogawantalawa Mr. Glanville (4,300) 9·09
Friedland, Bogawantalawa Mr. Rammell (5,200) 7·41
Campion, Bogawantalawa, Mr. Gidden, (4,840) 6·62
Blair Athol, Dikoya, Mr. Lane (3,641) 5·44
Annfield, Dikoya, Mr. Knight (4,300) 6·13
Maskeliya Hospital, Maskeliya Dr. Brohier (4,200) 6·59
Hope Estate, Hewaheta, Mr. Bagot (5,000) 10·14
Coldstream Estate, Watawala Mr. Spedding (3,800) 9·19

Holmwood Est., Agrapatana, Mr. Gray (5,240) 6·01
Sandringham, Agrapatana Mr. Orchard (5,200) 3·80
Gingran-oya, Kotmale, Mr. Cox (3,800) 6·54
Labookelle, Ramboda, Mr. Stone (5,000) 12.56
Dunsinane, Pundalu-oya, Mr. Metcalfe 4,800 7·97
Sogama, Pussellawa, Mr. Eustace (3,500) 7·70
Kurundu-oya, Maturata, Mr. Corbetta (5,150) 16·64
Kabaragalla, Maturata, Mr. Maclean (4,400) 12·90
Maragalla Estate, Moopana, Mr. Betts, (2,200) 9·53
Mupana, Hospital, Mupana (Mr. Sela) (500) 7·53
Madulsima Hospital Lunugala Dr. Vethecan (2,600) 12·94
Meeriabedda, Haputale, Mr. Dupuis (3,600) 11·97
Udahena Estate, Haputale, Mr. Bisset, (4,400) 11·60
Haputale Hospital Haputale Mr. VanRooyen (4800) 10·0
Post Office, Bandarawela, Mr. Mendis (4,033) 5·18
Callander, Ohiya Mr. Green (5,125) ...
Mariawatte, Gampola Mr. Salmond (1,600) 8·36
Orwell Estate, Gampola Mr. Taylor (1,800) 9·10
New Forest, Deltota, Mr. Wardrop (3,500) 11·66
Rajawella, Estate, Teldeniya Mr. Miller, (1,500) ...
Lower Spring Valley, Badulla Mr. Rettie (3,650) 10·18
Gonrakele Estate, Badulla Mr. Hope (1,200) 7·90
Mousagala Estate, Badulla, Mr. Deaker (4,500) 7·54
Ledgerwatte, Badulla Mr. Rettie (4,000) 21·72
Hambegamuwa Tank, Badulla (RanbandaKorala) ... 6·13
Dea Ella Estate, M'walatenna Mr. Vandersloot (800) 5·69
Sembawatte Estate, N'pitiya Mr. Roe (1,600) 10·09
Gammaduwa, Estate, Rattota Mr. Westland (2,400) 17·56
Kobonella Estate, Raogala, Mr. Pole (3,800) 24·00
St. Martins, Rangala, Mr. Wyllie (3,600) ...
Crystal Hill, Matale, Mr. Van Starrex (1,400) 10·94
Vicarton Estate, Matale Mr. Carrie (3,250) 9·73
Matale Mr. Tisseverasinghe (1,208) 8·36
Wariapolla, Matale, Mr. Dickenson (1,200) ...
Dambulla, Mr. Sinnetamby (400) 6·39
Kotta Estate, Pallai, Mr. Todd (13) 12·54
Mantota Hospital, Mannar. Mr. Adams (17) 17·92
Buttala Hospital, Buttala, Mr. Som sundaram — 5·42
Police Station, Hatton Police Constable, Miskin (1,141) 7·14
Medway Estate Nilaveli, Mr. Abraham, .. 13·99
Delwita, Kurunegala Mr. Neame (490) ...
Woodside, Uragalla Mr. MacMahon (3,000) 13·81
Gillardstown, Wattegama Mr. Hardy (2,500) 7·[illegible]
Ja-ela Hospital, Ja-ela Mr. Fernando (4) 12·62

SHARE LIST.

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ISSUED BY THE

COLOMBO SHARE BROKERS' ASSOCIATION.

CEYLON PRODUCE COMPANIES.

Company.	paid p. sh.	Buyers.	Sellers.	Transactions.
Agra Ouvah Estates Co., Ltd.	500	900	—	900
Ceylon Tea and Coconut Estates	500	—	950 n'l	..
Castlereagh Tea Co., Ltd.	100	—	90	90
Ceylon Hills Estates Co., Ltd.	100	—	—	..
Ceylon Provincial Estates Co.	500	480	..	480
Claremont Estates Co., Ltd.	100	..	..	—
Clunes Tea Co., Ltd.	100	—	—	..
Clyde Estates Co., Ltd.	100	—	—	..
Doomoo Tea Co., Ltd.	100	60	—	—
Drayton Estate Co., Ltd.	100	..	150	..
Ella Tea Co., of Ceylon, Ltd.	100	—	65	65
Estates Co., of Uva, Ltd.	500	220	250	..
Gangawatta	500	...	..	—
Glasgow Estate Co., Ltd.	500	905	910	905
Great Western Tea Co.,	500	...	640	..
Hapugahalande Tea Estate Co.	200	—	..	..
High Forests Estates Co., Ltd	500	—	—	525
Do -part paid	350	...	400	—
Horekelly Estates Co., Ltd.	100	...	—	..
Kalutara Co., Ltd.	500	..		—
Kandyan Hills Co., Ltd.	100	65	67·50	.
Kanapediwatte Ltd.	100	...	..	90
Kelani Tea Garden Co., Ltd.	100	40	..	..
Kirklees Estates Co., Ltd.	100	—	..	—
Knavesmire Estates Co., Ltd.	100	60	70	—
Maha Uva Estates Co., Ltd	500	..	425	400 xd
Mocha Tea Co., of Ceylon, Ltd.	500	600	—	600
Nahavilla Estate Co., Ltd.	500	—	450	...
Neboda Tea., Co. Ltd	500	..	500	—
Nyassaland Coffee Co. Ltd.	100	—	—	..
Ottery Estate Co., Ltd.	100	..	—	—
Palmerston Tea Co., Ltd.	500	—	400	...
Penrhos Estates Co., Ltd.	100	—	97·50	..
Pine Hill Estate Co., Ltd.	60	40	—	..
itakanda Tea Company	500	..	—	..
Putupaula Tea Co., Ltd.	100	—	120	—
Ratwatte Cocoa Co., Ltd.	500	—	—	..
Rayigam Tea Co., Ltd.	100	—	60	—
Roeberry Tea Co., Ltd.	100	..	45	—
Ruanwella Tea Co., Ltd.	100	—	40	..
St. Heliers Tea Co., Ltd.	500	500	—	..
Talgaswela Tea Co., Ltd.	100	27·50	30	30
Do 7 per cent. Prefs.	100	...	..	..
Tonacombe Estate Co., Ltd.	500	—	450	—
Udabage Estate Co., Ltd.	100	..	—	—
Udugama Tea & Timber Co., Ltd.	50	5	10	..
Union Estate Co., Ltd.	500	—	275	—
Upper Maskeliya Estate Co., Ltd.	500	..	475	475
Uvakellie Tea Co., of Ceylon, Ltd.	100	—	70	...
Vogan Tea Co., Ltd.	100	..	83	..
Wanarajah Tea Co.,Ltd.	500	1086	..	..
Yataderiya Tea Co., Ltd.	100	—	395	..

CEYLON COMMERCIAL COMPANIES.

Company.	paid p. sh.	Buyers.	Sellers.	Transactions.
Adam's Peak Hotel Co., Ltd.	100	—	—	..
Bristol Hotel Co., Ltd.	100	76	—	...
Do 7 per cent Debts	100	105	—	—
Ceylon Gen. Steam Navgtn. Co., Ltd.	100	210	212.50	—
Colombo Apothecaries Co., Ltd	100	142·50	145	..
Colombo Assembly Rooms Co., Ltd.	20	12·50	..	..
Do prefs.	20	—	..	..
Colombo Fort Land and Building Co., Ltd.	100	85	..	...
Colombo Hotels Company	100	297·50	—	295
Galle Face Hotel Co., Ltd.	100	150	..	..
Kandy Hotels Co., Ltd.	100	..	117·50	117·50
Kandy Stations Hotels Co.	100	..	30	—
Mount Lavinia Hotels Co., Ltd.	150	150	200	..
New Colombo Ice Co., Ltd.	100	175	—	177.50
Nuwara Eliya Hotels Co., Ltd.	100	27½	30	..
Public Hall Co., Ltd.	20	15	—	—
Petroleum Storage Co.	100	—	—	—
Do 10 % prefs.	100	—	...	—

LONDON COMPANIES.

Company.	paid p. sh.	Buyers.	Sellers.	Transactions
Alliance Tea Co., of Ceylon,	10	8½	—	..
Anglo Ceylon General Estates Co.	100	—	35—40	..
Associated Estates Co., of Ceylon	10	—	3—5	...
Do. 6 per cent prefs.	10	..	7½	..
Ceylon Proprietary Co.	1	...	12·6—17 6	..
Ceylon Tea Plantation Co.,	10	..	24½—25½	—
Dimbula Valley Co.,	5	..	5½—6	—
Do prefs.	5	..	..	—
Eastern Produce and Estates Co.	5	...	5½—6	...
Ederapolla Tea Co.,	10	...	7—8	..
Imperial Tea Estates	10	...	5—6	..
Kelani Valley Tea Asscn.	5	..	5—6	..
Kintyre Estates Co.,	10	7½	7—9	..
Lanka Plantation Co.,	10	4½	4—5	..
Nahalma Estates Co.,	1	—	¼—¾	..
New Dimbula Co.,	1	—	2½—3	..
Nuwara Eliya Tea Estate Co.	10	...	—	
Ouvah Coffee Co.,	10	7	—	..
Ragalla Tea Estates Co.,	10	—	10	..
Scottish Ceylon Tea Co.,	10	—	14—15	.
Spring Valley Tea Co.,	10	3	4—5	..
Standard Tea Co.,	6	—	11—12	..
The Shell Transport and Trading Company,	100	—	—	—
Yatiyantota Ceylon Tea Co.,	10	—	8—9	..
Yatiyantota pref. 6 o/o	10	10	—	..

BY ORDER OF THE COMMITTEE.

Colombo, March 30th, 1900

Latest London Prices.

THE LOCAL MARKET.

(By Mr. James Gibson, Baillie St., Fort.)

Colombo, March 27th, 1900.

COFFEE :—	
Estate Parchment per bushel	None offering
Chetty do do	None offering
Native Coffee per cwt.	None offering
do F. O. B per cwt.	None offering
Liberian coffee:—per bushel	R4 00 to 4·50
do cleaned coffee:—per cwt	R22·00 to 24·00
Cocoa unpicked:—per cwt	None offering
do cleaned do	None offering
Cardamoms Malabar per lb	R00·90 to 1·00
do Mysore do	R1·60 to 1·75
RICE :—	
Soolai per bag of 164 lb. nett	R9·10 to 9·30
Slate or 1st quality:—per bushel	R3·40 to 3·44
Soolai 2 & 3rd. do do	R3·32 to 3·38
Coast Calunda	R3·90 to 4·00 Scarce
Coast Kara	R3·80 to 3·87 do
Kazala	R3·30 to 3·33
Muttusamba Ordinary	R3·87 to 4·25
Cinnamon per lb No 1 to 4	R00·54
do do 1 to 2	R00·64 to 00·66
do Chips per candy	R90·00 to 95·00
Coconuts Ordinary per thousand	R35·00 to 38·00
do Selected do	R36·00 to 39·00
Coconut Oil per cwt	R14·37½ to 14·75
do do F. O. B. per ton	R287·50 to 295·00
POONAC :—	
Gingelly per ton	R120·00 to 125·00
Coconut Chekku do	R85·00 to 87·50
do Mill (retail) do	R80·00 to 82·50
Cotton Seed per ton	R82·50 to 85·00
Copra per candy	
Kalpitiya do	R44 00 to 45·50
Marawilla do	R44·00 to 45·25
Cart Copra do	R38·00 to 43·00
Satinwood per cubic feet.	R2 00 to 2·25
do Flowered do	R5·00 to 6·00
Halmilla do	R1·90
Palu do	R1·00 to 1·12
Ebony per ton	R75·00 to 175·00
Kitul fibre per cwt	R28·00 to 30·00
Palmyra do do	R5·00 to 15·50
Jaffna Black Cleaned per cwt	R15·50
do mixed do	R12·50 to 13·00
Indian do	R8·00 to 13·50
do Cleaned do	R10·00 to 15·50
Sapanwood per ton	R55·00 to 58·00
Kerosene oil American per cases	R8·00 to 8·25
do bulk Russian per tin	R3·35 to 3·40
do Russian per cases	R6·90 to 7·12
Nux Vomica per cwt	R2·00 to 3·50
Croton Seed per cwt	R23·00 to 28·00
Kapok cleaned f o b per cwt	R24·00
do uncleaned do	R5·50
Plumbago per ton, according to grade: Large lumps	R500·00 to 1000·00
do	R400·00 to 900·00
Chips	R225·00 to 650·00
Dust	R100·00 to 500·00

COLOMBO PRICE CURRENT.

(Furnished by the Chamber of Commerce.)

Colombo, 26th March, 1900.

CARDAMOMS:—
All round parcel, well bleached per lb. R1·40
Do. dull medium do. 1·10
Special assortment, 0 and 1 only do. No transactions
Seeds do. 1·40

CINCHONA BARK:—
Per unit of Sulphate of Quinine 10c—For 1 to 4 o/o

CINNAMON:—
Ordinary assortment per lb. 60c.
Nos. 1 and 2 only per lb. 66c
Nos. 3 and 4 only per lb. 55c.

CINNAMON CHIPS:—
Per candy of 560 lb R92·50

COCOA:—
Finest estate red; unpicked per cwt }
Medium do do ,, } None
Bright native, unpicked and undried ,, } offering.
Ordinary do do do ,, }

COCONUTS—(husked).
Selected per thousand R48·00 }
Ordinary ,, R40·00 } Scarce.
Smalls ,, R28·00 }

COCONUT CAKE—
Poonac in robins f. o. b. per ton R80·00
Do. in bags R65·00

COCONUT (Desiccated).
Assorted all grades per lb. 13¾c

COCONUT OIL—
Dealers' Oil per cwt. R14·50.
Coconut Oil in ordinary packages, f. o. b. per ton R330·00.—Sellers.

COFFEE—
Plantation Estate Parchment on the spot per bus. —None offering.
Plantation Estate Coffee f.o.b. (ready) per cwt.—None offering.
Native Coffee, f.o.b per cwt.—None offering.

CITRONELLA OIL—
Ready do per lb. 65c—In drums of 800 lbs exclusive of packages.
do do per lb. 64c do of 90 lbs

COPRA—
Boat Copra per candy of 560 lb. R45·50 }
Calpentyn Copra do do R45·50 } Fair
Cart do do do R42·00 } supply.
Estate do do do R45·50 }

CROTON SEED per cwt R25·00

EBONY—
Sound per ton at Govt. depot R175.—As per last Government Sales, Nov. 15th.
Inferior per ton at Govt. depot R120.—As per last Government sales of 15th November.

FIBRES—
Coconut Bristle No. 1 per cwt R11·00
Do ,, 2 ,, 8·00
Do mattress ,, 1 ,, 2·75
Do ,, 2 ,, 2·00
Coir Yarn Kogalla ,, 1 to 8 18·00
Do Colombo ,, 1 to 8 16·00
Kitool all sizes 38·00
Palmyrah 16·00

PEPPER—Black per lb 28c.

PLUMBAGO—
Large lumps ,, per ton R950 }
Ordinary lumps ,, ,, 900 }
Chips ,, ,, 650 } Sellers.
Dust ,, ,, 500 }
Do (Flying) 200 }

SAPANWOOD— per ton R52
SATINWOOD (ordinary) per cubic ft. R2·40

TEA—	High Grown Average.	Medium Average.	Low Grown Average.
Broken Pekoe and Broken	cts	cts	cts
Orange Pekoe per lb	59	49	33
Orange Pekoe do	59	42	33
Pekoe do	43	40	31
Pekoe Souchong do	39	35	27
Pekoe Fannings do	34	29	28
Broken mixed—dust, &c. per lb	27	27	27

CEYLON EXPORTS AND DISTRIBUTION, 1899-1900.

COUNTRIES	Tea, 1900 lbs.	Tea, 1899 lbs.	Coffee—cwt. Plantation	Coffee—cwt. N'tive	Coffee—cwt. Total.	Cocoa cwts.	C'moms lbs.	Cinnamon. Bales lbs.	Cinnamon. Chips. lbs.	Coconut Oil. 1900 cwts	Coconut Oil. 1899 cwts	Copra cwts.	Desiccated Coconut lb.	Poonac cwts.	Coconuts. No.	Plumbago. 1900 cwts.	Plumbago. 1899 cwts.	Ebony cwts.	Sapanwood cwts.
To U K. ..	23156737	19407336	1249	..	1249	9691	81541	151038	76100	53349	23853	7109	1105337	..	1511826	23346	27727	...	2876
,, Austria ..	2069	741	..	..	..	..	..	...	19600	2220	851	5906	525	...	.	..	14	..	480
,, Belgium ...	1880	3683	30	..	30	63	...	16200	13400	..	..	27079	...	21297	...	7519	4713	...	..
,, France ..	44276	36036	..	...	..	33	2623	58988	604	...	...	11974	2078	...	..	..	306	220	...
,, Germany ..	88349	59401	..	..	..	109	32328	139300	107976	2545	..	23114	173743	11450	155005	14347	16516	1119	856
,, Holland ..	2060	..	...	..	..	..	...	..	22400	..	..	..	35600	.	...	912	2926	...	...
,, Italy ..	1433	4440	..	..	..	...	...	24700	5600	..	205	1500	..	..	1050	...	..	45	...
,, Russia ..	1850236	449509	15	..	15	...	..	..	...	..	..	24003	..	...	1590	...	..	..	..
,, Spain ..	7470	5000	..	...	..	..	..	55000	16800	..	..	..	...	...	..	..	...	..	..
,, Sweden ..	21725	7228	..	..	..	...	560	2000	..	...	..	4403	...	..	..	105	101	...	...
,, Turkey ..	7061	5994	..	..	..	..	1000	...	..	..	..	..	...	..	..	...	..	...	..
,, India ..	151269	142017	44	..	44	..	19023	..	..	12515	8785	..	.	..	9500	69	68	..	23
,, Australia ..	3279815	3379287	523	..	523	..	..	2700	8736	21	251	..	129177	..	..	210	719	...	.
,, America ..	1328340	611056	9	..	9	278	...	101800	44800	24246	22548	..	485990	...	..	59322	50393	..	..
,, Africa ..	54598	15008	..	..	..	..	1120	100	2408	...	..	..	9275	...	385245	..	..	..	...
,, China ..	179855	227948	6	...	6	62	1800	...	...	..	2194	..	13220	...	..	..	..	..	...
,, Singapore ..	17891	16585	..	..	..	405	..	..	..	...	17812	..	...	..	—	...	..	...	..
,, Mauritius ..	...	6890	..	..	..	..	...	...	..	..	..	...	...	..	...	..	...	..	...
,, Malta ..	95178	47552	..	...	..	..	..		.	...	...	...	..	..	..	..	..	..	...
Total export from 1st Jan. to 26th Mar. 1900	30290182	24425711	1876	..	1876	10641	140005	561826	318424	94896	76499	105088	1954945	32747	2064216	105830	103483	1384	4235

MARKET RATES FOR OLD AND NEW PRODUCTS.

(From Lewis & Peat's Fortnightly Prices Current, London, February 21st, 1900.

	QUALITY.	QUOTATIONS.
ALOES, Socotrine cwt.	Fair to fine dry ...	44s a 100s
Zanzibar & Hepatic ,,	Common to good ..	20s a 60s
BEES' WAX, ,,		
Zanzibar & Bombay { White ,,	Good to fine	£6 a £7 10s
{ Yellow ,,	Fair ,,	£5 15s a £7
Madagascar ,,	Dark to good palish	£6 5s a £6 12s 6d
CAMPHOR, China ,,	Fair average quality	162s 6d
Japan ,,	,, ,,	170s
CARDAMOMS, Malabar lb	Clipped, bold, bright, fine	2s 6d a 2s 9d
	Middling, stalky & lean	1s 7d a 2s
Ceylon.—Mysore ,,	Fair to fine plump ..	3s 5d a 4s 1d
	Seeds	1s 6d a 2s 6d
,, Tellicherry ,,	Good to fine ..	2s 11d a 3s
	Brownish	2s 6d
,, Long ,,	Shelly to good ..	2s 11d a 4s
,, Mangalore ,,	Med brown to good bold	2s 3d a 3s 3d
CASTOR OIL, Calcutta ,,	1sts and 2nds ..	3¼d a 4¼d
Madras ,,	..	
CHILLIES, Zanzibar cwt.	Dull to fine bright ...	40s a 47s 6d
CINCHONA BARK.— Ceylon lb.	Crown, Renewed	5d a 7d
	Org. Stem	3¾d a 5½d
	Red Org. Stem	4⅜d a 5⅝d
	Renewed	5¾d a 7½d
	Root	3¾d a 4d
CINNAMON, Ceylon 1sts per lb.	Ordinary to fine quill	10d a 1s 8d
2nds	,, ,,	9½d a 1s 5d
3rds	,, ,,	8½d a 1s 4d
4ths	,, ,,	8d a 11½d
Chips	,, ,,	2½d a 8d
CLOVES, Penang lb.	Dull to fine bright bold	5½d a 9d
Amboyna ..	Dull to fine	4½d a 5½d
Zanzibar and Pemba }	Good and fine bright	4⅜d
	Common dull to fair	4d a 4¼d
Stems ..	Fair	1¾d
COCULUS INDICUS cwt.	Fair	9s
COFFEE Ceylon Plantation ,,	Bold to fine bold colory	100s a 115s
	Middling to fine mid ..	85s a 95s
	Low mid. and low grown	75s a 82s 6d
	Smalls	55s a 75s
Native	Good ordinary	30s a 70s
Liberian ,,	Small to bold	33s a 40s
COCOA, Ceylon ,,	Bold to fine bold	85s a 95s
	Medium and fair	73s a 82s 6d
	Triage to ordinary	60s a 70s
COLOMBO ROOT ,,	Fair to good	22s 6d a 30s
COIR ROPE, Ceylon ton		nominal
Cochin ,,	Ordinary to fair .	£17 a £20 10s
FIBRE, Brush ,,	Ord. to fine long straight	£16 a £19
Cochin ,,	Ordinary to good clean	£18 a £24
Stuffing ,,	Common to fine	£7 a £9
COIR YARN, Ceylon ,,	Common to superior	£15 a £33
Cochin ,,	,, ,, very fine	£12 a £32
do. ,,	Roping, fair to good	£10 a £14 10s
CROTON SEEDS, sift. cwt.	Dull to fair	38s a 45s
CUTCH ,, ,,	Fair to fine dry	28s a 42s
GINGER, Bengal, rough ,,	Fair	26s
Calicut, Cut A ,,	Good to fine bold	87s 6d a 92s 6d
B & C ,,	Small and medium	35s a 72s 6d
Cochin Rough ,,	Common to fine bold	25s a 34s
	Small and D's	25s a 28s
Japan ,,	Unsplit	21s
GUM AMMONIACUM ,,	Sm. blocky to fine clean	20s a 45s
ANIMI, Zanzibar ,,	Picked fine pale in sorts	£10 7s 6d a £20
	Part yellow and mixed	£8 2/6 a £10 10s
	Bean and Pea size ditto	70s a £9 2/6
	Amber and dk. red bold	£5 10s a £7 10s
	Med. & bold glassy sorts	80s a 100s
Madagascar ,,	Fair to good palish	£4 8s a £8
	,, ,, red	£4 5s a £9
ARABIC E. I. & Aden ,,	Ordinary to good pale	40s a 60s
Turkey sorts ,,		67s 6d a 85s
Ghatti ,,	Pickings to fine pale ...	12s 6d a 35s
Kurrachee ,,	Good and fine pale ...	52s 6d a 55s
	Reddish to pale selected	30s a 40s
Madras ,,	Dark to fine pale	23s a 35s
ASSAFOETIDA ,,	Clean fr to gd. almonds	40s a 80s
	Ord. stony and blocky	8s a 25s
KINO ,,	Fine bright	1s 6d
MYRRH, picked ,,	Fair to fine pale	65s a 75s
Aden sorts ,,	Middling to good	33s a 55s
OLIBANUM, drop ,,	Good to fine white	35s 6d a 50s
	Middling to fair	25s a 35s
pickings ,,	Low to good pale	17s a 20s
siftings ,,	Slightly foul to fine	16s 6d a 18s
INDIARUBBER, Assam lb	Good to fine	2s 10½d a 3s 4d
	Common to foul & mxd.	1s 4d a 2s 6d
Rangoon	Fair to good clean ...	2s 9d a 3s 3½d
	Common to fine	1s a 2s 4d

	QUALITY.	QUOTATIONS
INDIARUBBER, (Contd). Java, Sing. & Penang lb.	Foul to good clean ..	8d a 3s 3½d
Mozambique ,,	Good to fine Ball ...	2s 8d a 3s 7d
	Ordinary to fair Ball..	2s a 2s 10½d
	Low sandy Ball	1s 3d a 1s 7d
	Sausage, fair to good...	3s 2d a 3s 6d
	Liver and livery Ball	2s 4d a 3s 2½d
Madagascar ,,	Fr. to fine pinky & white	3s a 3s 6½d
	Fair to good black .	2s a 2s 10½d
	Niggers, low to fine ..	1s 4d a 2s 10d
INDIGO, E.I. ,,	Bengal—	
	Shipping mid to gd violet	3s 9d a 4s 6d
	Consuming mid. to gd.	3s 6d a 3s 8d
	Ordinary to mid.	3s 2d a 3s 5d
	Mid. to good Kurpah	2s 2d a 2s 8d
	Low to ordinary	1s 11d a 2s 1d
	Mid. to good Madras	1s 5d a 2s 6d
MACE, Bombay & Penang per lb.	Pale reddish to fine	2s a 3s
	Ordinary to fair	1s 4d a 1s 11d
	Pickings	1s 4d a 1s 4½d
MYRABOLANES, Madras } cwt	Dark to fine pale UG	6s a 7s
	Fair Coast	5s 6d a 6s
Bombay ,,	Jubblepore	4s 3d a 7s
	Bhimlies	4s 9d a 9s 6d
	Rhajpore, &c.	4s 3d a 8s
Bengal ,,	Calcutta	4s 6d a 6s
NUTMEGS— lb.	64's to 57's	2s 4d a 2s 6d
Bombay & Penang ,,	110's to 65's	11½d a 2s 3d
	160's to 130's	6d a 11d
NUTS, ARECA cwt.	Ordinary to fair fresh	12s a 21s
NUX VOMICA, Bombay per cwt.	Ordinary to middling	4s a 5s 6d
Madras	Fair to good bold fresh	7s a 10s
	Small ordinary and fair	5s 6d
OIL OF ANISEED lb	Fair merchantable	6s
CASSIA ,,	According to analysis	3s 6d a 4s
LEMONGRASS ,,	Good flavour & colour	2¾d
NUTMEG ,,	Dingy to white	3d a 3½d
CINNAMON ,,	Ordinary to fair sweet	3½d a 1s 6d
CITRONELLE ,,	Bright & good flavour	11d a 1s 1/0½d
ORCHELLA WEED—cwt Ceylon ,,	Mid. to fine not woody...	10s a 12s 6d
Zanzibar. ,,	Picked clean flat leaf ...	10s a 16s
	,, wiry Mozambique	10s a 11s
PEPPER-(Black) lb. Alleppee & Tellicherry	Fair to bold heavy ..	6⅛d a 6 3-16d
Singapore ...	Fair	6⅛d a 6 3-16d
Acheen & W. C. Penang	Dull to fine	5¼d a 5¾d
PLUMBAGO, lump cwt.	Fair to fine bright bold	55s a 60s
	Middling to good small	41s a 53s
chips ,,	Dull to fine bright ..	21s a 45s
dust ,,	Ordinary to fine bright	7s a 20s
SAFFLOWER ,,	Good to fine pinky	65s a 75s
	Inferior and pickings ..	40s a 60s
SANDAL WOOD— Bombay, Logs ton.	Fair to fine flavour ..	£20 a £50
Chips ,,	... ...	5s a £8
Madras, Logs ,,	Fair to good flavour ..	£20 a £50
Chips ,,	Inferior to fine ...	£4 a £8
SAPANWOOD Bombay ,,	Lean to good ..	£4 a £5
Madras ,,	Good average ..	£4 a £5 nom.
Manila ,,	{ Rough & rooty to good	£4 10s a £5 15s
Siam ,,	{ bold smooth...	£6 a £7
SEEDLAC cwt.	Ord. dusty to gd. soluble	53s a 59s
SENNA, Tinnevelly lb	Good to fine bold green	5d a 8d
	Fair middling medium	4d a 5½d
	Common dark and small	1½d a 3½d
SHELLS, M. o'PEARL— Bombay cwt.	Bold and A's / D's and B's / Small ...	£4 a £5 5s
Mergui ,,	Small to bold ..	£6 a £8
Mussel ,,	Small to bold ...	£1 a £2 15s
TAMARINDS, Calcutta... per cwt.	Mid. to fine bl'k not stony	15s a 16s
Madras	Stony and inferior ..	7s 6d a 11s
TORTOISESHELL— Zanzibar & Bombay lb.	Small to bold dark mottle part heavy	15s a 23s 6d
TURMERIC, Bengal cwt.	Fair ...	30s
Madras ,,	Finger fair to fine bold bright	30s a 32s 6d
Do. ,,	Bulbs ..	17s
Cochin ,,	Finger ..	21s
	Bulbs ...	9s a 10s 6d
VANILLOES— lb. Mauritius and Bourbon } 1sts	Gd. crystallized 3½ a 9 in	17s 6d a 27s
2nds	Foxy & reddish 4½ a 8 ,,	17s a 24s
Seychelles 3rds	Lean and inferior ...	10s a 15s
VERMILION lb.	Fine, pure, bright ...	3s 8d
WAX, Japan, squares cwt	Good white hard ...	30s 6d a 31s

THE
AGRICULTURAL MAGAZINE,
COLOMBO

Added as a Supplement Monthly to the "TROPICAL AGRICULTURIST."

The following pages include the Contents of the *Agricultural Magazine* for April:—

Vol. XI.] APRIL, 1900. [No. 10.

THE AGRICULTURAL SCHOOL.

ANNUAL PRIZE-GIVING.

ON Saturday, March 31, the annual prize-giving of this institution was held in the presence of a large gathering presided over by Mr. S M Burrows, Director of Public Instruction. Much pains had been bestowed to decorate the main hall and the long corridor leading to it, and the effect presented was most pleasing. A well constructed pandal was put up at the entrance, bearing the inscription "Welcome to Mr. S M Burrows, Director of Public Instruction." Among those present were:—Lady and Miss Grenier, Mrs. Ferguson and Misses Williams and Macdougall (of Madras), Mrs C Drieberg, the Very Rev Father Collin, Rev Brothers William, Edmond and Cassian, Messrs J Harward, E Elliott, Jas Pieris, Jacob de Mel, W Arthur De Silva, Mrs North, Mr Scott Given, Mr Francis Beven, the Misses Beven and Drieberg, Dr and Mrs J B Drieberg, Mrs Bawa, Arthur Bawa, Dr Chinniah, Morgan de Saram and the Misses Bawa, Messrs B W Bawa, Allan Drieberg, the Misses Barber, Mrs H O Beven, the Misses Vanderstraaten, Mr. R H Ferguson, and many others.

Mr. BURROWS called upon Mr Drieberg, the Superintendent of the School, to read

THE PRINCIPAL'S REPORT.

I have much pleasure in offering a hearty welcome to our new Director, who is present for the first time at a public function connected with this Institution.

Let it be admitted that such enthusiasm as Mr. Green (the founder of this School) showed in matters Agricultural was rare, and that the School suffered for lack of interest on the part of his successor, when it is seriously proposed to dissociate this Institution from the Educational Department. I venture to think that so sweeping a change is ill-conceived at the present time, when we have as our head one who is so eminently fitted to be Director, both of Education and Agriculture, who may be expected to avoid the mistakes which the founder of the School (like all pioneers) was bound to make, and to pursue an enlightened policy based on his experience of the country and a knowledge of the requirements of the people.

During the last few weeks, in addition to the usual annual report, I have, at the request of the Director, prepared a special memorandum dealing fully with the school, its past, present and future. But you will, I feel sure, prefer to read these documents when they appear in print, or to call for them whenever it may suit your convenience, rather than that I should take advantage of your kind presence here today to intrude them upon your attention. I shall therefore occupy very little of your time. I will not repeat the recommendations which I have from time to time offered in previous reports, for making this institution serve its object more worthily. I must say, however, that I have begun to be a little hopeful of some of these recommendations being carried into effect, if the sympathy of the head of a department counts for anything. And this is naturally a source of satisfaction after years of unsatisfied expectancy. There are, moreover, rumours of a special Committee having been appointed to deal with the school—a circumstance which is calculated to strengthen our hope that some definite measures for the good of the school will soon be decided on.

As regards numbers, our largest number on the roll last year was 22, and the average for the year 16.

These are rather below the normal: the full complement being 25 and the usual average 20. The decrease is to be attributed to the uncertainty attaching to the future of the school. Indeed, the wonder is that, under present conditions, our numbers are what they are. In India, with greater inducements for the study of agriculture, and with prospects of employment to trained students, there are instances of the attendance at agricultural classes being far more disappointing. Were we only half as fortunate as our sister institutions in India as regards financial aid, provision for a thorough course of training and inducements offered to students, the School of Agriculture will be rather a different institution to what it is.

On the results of the final examination held last November, three students became entitled to the first class certificate of merit granted by the Department.

Veterinary training continues to form part of the School course and already three old boys of the school have fully qualified as veterinary surgeons, while two others have lately been appointed stock-inspectors. The present Government Veterinary Scholar is J E Fernando—also a late student of the school—who left for Bombay at the end of last year to prosecute his studies at the Veterinary College there. He succeeded Veterinary-Surgeon Chinniah, who, with commendable enterprize, started practice in Colombo on his own account—a departure which, I believe, he has no reason to regret.

The other institutions (the existence of which few persons are aware of) located in this building are the Government Training and Practising Schools and the School of Forestry. But of these I have no excuse to say anything today. The Government Dairy, however, is more intimately connected with the School of Agriculture, and I am able to report that it has been working satisfactorily during the past year. We have now in the Dairy 82 cows, 72 calves and seven bulls, or, a total of 161 animals.

The net profit from the Dairy on last year's working was nearly R2,500, while that from the Model Farm exceeded R3,000. In addition to this a sum of R4,337 was realized by the sale of stock, principally young stock bred on the farm. The Dairy has now paid back to Government the sum of R11,500 advanced for working of the concern; over and above which it has refunded a sum of nearly R13,000. against an initial expenditure of R19,539 on buildings and equipment. But then our stock-in-trade was at the end of last year reasonably estimated to be worth R13,500, a sum which, I think, the most cautious speculator would be willing to give for it. But, while all this is very satisfactory, the School of Agriculture of which the Dairy is an offshoot, derives no advantage by the prosperity of the latter.

It is a pleasure to me to be able to count Mr. Harward among the speakers this evening. The short time he acted as Director was more than sufficient to impress us with his worth, and for his continued interest in this institution we are most grateful.

I must not omit to acknowledge our indebtedness to Mr. J W C De Soysa, who with traditional liberality, continues to present the handsome prize which the late Mr. Charles De Soysa first offered for competition among our students.

Finally, I have the pleasant duty of thanking you, ladies and gentlemen, for your encouraging presence here today, for, I say it regretfully, our friends are all too few.

The prizes weredistributed by the Chairman :—

THE PRIZE LIST.

Senior Form:—1, English, E W Jayatilleke; 2. Mathematics, G S Jayasinghe; 3, Agriculture, G S Jayasinghe; 4, Science, P C Fernando; 5, Practical Chemistry, G S Jayasinghe; 6, Veterinary, E W Jayatilleke.

Junior Form:—1, English, M D S A Wijenaike; 2, Mathematics, C S Fernando; 3, Agriculture, M D S A Wijenaike; 4, Science, M D S A Wijenaike: 5, Veterinary, C S Fernando; 6 Dairying, M D S A Wijenaike.

The following are the winners of the certificates:— E W Jayatilleke, G S Jayasinghe, P C J Fernando.

THE CHAIRMAN'S SPEECH.

The Chairman said, after some introductory remarks, that in Ceylon the very best reason for making a speech was that one practically knew nothing of the subject on which he was speaking. (Laughter.) He had been appointed on a great and awful Committee sitting to discuss the future of the Agricultural School. The Committee was composed of men whose very titles would fill them with awe, and if he divulged any of their secrets he would probably be condemned to death by sealing wax or choked to death by red tape. Therefore, his hands were tied in that direction entirely. It was impossible to say what the future of the Agricultural School would be. But he would like to say something of its past. It was the hobby of a very old friend of his—Mr. H. W. Green. Mr. Green was a man on whom the vials of criticism were freely poured. People were very ready to criticise and to show how much better they could have done a thing themselves. But there was this to say of Mr. Green—unlike certain other people, he attempted to do something. But few people realised what he had in mind, and when he started the Agricultural School people said he was trying to do an impossible thing—to improve agriculture in Ceylon! Personally, he (Mr. Burrows) did not believe it was impossible. There were various methods of doing it, and people might differ very widely as to the best methods to adopt, but the best way to set about it was to make some effort in some direction. Mr. Green did make an effort, and he deserved intense gratitude for the effort he made. And that brought him (the speaker) to the obvious conclusion that the gentleman to whom was entrusted the carrying out of Mr. Green's ideas deserved the fullest measure of praise. It was not easy to carry on an institution to which help had not always been given. The School of Agriculture, however, had not wanted the energy and perseverance of Mr. Drieberg. Those advantages had been most fully and ably offered. Mr. Drieberg could look back on the fact that he had trained 25 or 30 men who had taken to the career that was predestined for them and they were thoroughly creditable to the training they had received. Those present should all join in congratulating Mr. Drieberg most heartily upon the admirable work he had done in the school.

MR. HARWARD'S COMMENTS.

Mr. Harward said that during a short tenure of the office of Acting Director of Public Instruction, it was a great pleasure to him to be very constantly, for different reasons, within those premises. In fact he became nearly as familiar with them as with those of the Royal College. It was true he did not go there with any knowledge of the subject of Agriculture proper, nor with any ideas to suggest to the Superintendent of the School. Mr. Drieberg was, however, kind enough to go very fully into the question of what his school course was, and how the time of the students was occupied, and he had formed the idea,—and still had the idea—that so far as his opportunities went, and so far as means allowed and the existing constitution of the school admitted, he was doing his very best for it. He also received intimation from the public press and elsewhere that considerable changes were contemplated with regard to the school, and that, in fact, even a Commission was sitting, which was deliberating as to its future destiny. Of the verdict of that Commission he knew nothing, but he hoped they might regard the present state of the School of Agriculture, so far as Agriculture itself was concerned, as being in a chrysalis state, and that something further would be done for it which would enable it to put forth wings and assume the splendours of the butterfly, and let them hope, when it was in that condition also it would be associated with the able management of Mr. Drieberg. (Applause.) One thing was certain,

and that was that the School had not had a fair chance in the past. He did not mean to say there would have been anything necessarily defective in the ideas with which it was started, but funds had not been forthcoming for the full carrying out of those ideas, and changes had been introduced from time to time which had prevented the carrying out of any one consistent idea. In estimating in any way the work of that school, they must not lose sight of the fact that it had formed a centre round which a very large amount of useful work had been done in other subjects than those of Agriculture, strictly speaking, and by Mr. Rodrigo, the Manager of the Dairy, and he had no hesitation in saying, that its existence had been of very great service to the School had served as a centre, to which was to be attached a Forestry Class, which had also done excellent work. It had been of great use also to the Department of Public Instruction by providing a local habitation to what was of very great use to the Department, namely a small Government Training School, and he might add that those who had been trained in that school had derived very useful kuowlege of Agricultural principles, by being associated with that building. Ceylon was essentially an agricultural country. Living in Colombo they were apt to lose sight of that fact. They saw very little of agriculture in Colombo. The eyes of the people were rather fixed on trade and commerce and things in the way of manufacture, and were apt to lose sight of the fact that Ceylon was essentially an agricultural country, and was dependent for its prosperity mainly on agriculture of various kinds. It ought to be an axiom, that an Agricultural School or College ought to be one of the educational institutions of the island. (Applause).

PRACTICAL AGRICULTURE.

MR. E. ELLIOTT said he had simply come there, being naturally interested in the occasion, and to hear what had been doing in the School for the last few years. Some years ago he addressed them on a similar occasion. He was then a Government Agent. He was now a *Goiya*. (Laughter). He had practical experience for the last three years of growing a considerable extent of paddy, and he had had, like a great many pioneers, to buy his experience. He had no reason to regret what he had done, and he hoped that before long he would be able to satisfy men of business of the soundness of the venture he had embarked on, and he was sure there would be a good many people, erelong, who would regret that they did not go in for coconuts and other low-country products. Of course, there was a great difference between the practical growing of a large area—he had 500 acres of paddy—and the theoretical growing of two acres, under an instructor. One could not repeat on a large scale the immediate results of what was practically horticulture. What he had seen of the students educated in that school convinced him that they were very satisfactory men. Several in the Eastern Province worked with him, and he was at present assisted very ably by a gentleman—a relative of the superintendent and bearing the same name. That gentleman had been most useful to him as an assistant, and the practical education which he had received in that school had been of most valuable assistance to him, and would be, he trusted, of still greater value in time to come. He (Mr. Elliott) could quite support the view which Mr. Harward had enunciated, that the Agricultural School had been a decided success, though working under considerable difficulties for a number of years past. He had also had several communications with Mr. Drieberg who had given him various hints and assisted him in getting various kinds of paddy, etc., and he was glad to be able to publicly acknowledge all that had been said of him on that occasion. He trusted that the new scheme, that was under consideration for improving the school would include some arrangement for giving the school a good large piece of decent land. They could not do much on the adjacent cinnamon land. What they wanted was a plot of 50 or 100 acres of land, which they could practically cultivate on a respectable scale and make experiments on. Experiments, of course, cost money, and people who were working for profits could not afford to make experiments as fully and exhaustively as a Government institution could. All over America there were Government farms, kept up at Government expense, where all sorts of things were grown and all sorts of manures were tried, and the results published. That was what was wanted in Ceylon, not only as regards paddy, but even with other products. The native cultivator, after all, was not such a bad cultivator as some people thought. He was no modern agriculturist it was true, but he had generations of experience and tradition, which stood him in very good stead. If he had had more time he might have put together some more ideas. Living as he did, in the jungle, did not train him to public speaking. (Laughter.) As Mr. Drieberg had said, he hoped, if there was any change, that it would not be of such a nature as to take the school out of the fostering care of Mr. Burrows. (Applause.)

THE MAYOR'S FORECAST: CATTLE DISEASE MAY BE STAMPED OUT.

MR. PRICE (Mayor of Colombo) proposed a vote of thanks to the Director of Public Instruction for so ably presiding at that meeting. They had all listened with much pleasure and gratification to his eloquent address; and equally to the speech which Mr. Harward had given with his accustomed ability, and similarly to the practical remarks which fell from Mr. Elliott. None of them who lived here and there settled in this country could affect to ignore the importance of agriculture, and he had listened with attention to the report which Mr. Drieberg read at the outset of the proceedings. One point specially attracted his attention, and that was what he said—and others touched on afterwards—with reference to the education of Veterinary Surgeons. That was most important as they all knew. He specially recognized the importance, because a short time ago—a few months ago—he was considering and elaborating with the aid of Mr. W A de Silva, a scheme for quarantining all cattle imported into Ceylon from India, the object in view being to stamp out all cattle disease. At first they thought that if they obtained money and elaborated a scheme and obtained the necessary legislation to enable them to inspect and quarantine every head of cattle imported from India, they might be confident they would then succeed in eventually stamping out cattle disease in Ceylon. However he went to work slowly, on purpose, and after discussing it with officers of greater experience, they came to the conclusion that the measure proposed was a good one; but, he thought

that it would not be sufficient, because there were centres of affection in Ceylon where the disease had to be stamped out. To stamp it out they wanted a trained staff of Veterinary Surgeons. If the School of Agriculture trained Veterinary Surgeons, and if the authorities in Colombo, where the school was in progress, provided a scheme of quarantine that could be elaborated, he saw every prospect of a most material benefit accruing to Ceylon, namely the total stamping out of cattle disease. He commended the idea to the head of the School and to the head of the Department, and he felt they would all endorse his proposal that they should pass a vote of thanks to the Director of Public Instruction for presiding on the occasion. (Applause.)

Cheers were given for the chairman, Mrs. Burrows, Mr. Harward and Mr. and Mrs. C Drieberg, and a musical entertainment, in which several amateurs took part, concluded the interesting and instructive proceedings.

(*From the "Ceylon Observer."*)

The periodical function at the Agricultural School which took place in the school hall on Saturday was a pronounced success Mr Drieberg's report, which we published in our issue of that evening, was eminently encouraging; and its contents, taken as a whole, appeared to us scarcely to justify the note of, we might almost say, despondency with which it closed. Yet it is perhaps too true that expert agricultural training in new and improved methods of cultivation has not yet acquired that popularity which the sterling work accomplished by both present and past students of the School already, fully merits. It is, indeed, to be hoped that the "Committee now sitting on the future of the school," as Mr. Burrows put it, has in mind some such scheme of extending the experimental scope of the Institution as that which the third speaker, Mr. Edward Elliott, suggested—namely, to grant for the school property (probably near Kandy) something like 50 to 100 acres on which sufficiently extensive and instructive scientific work could be done. Mr. Elliott spoke as an experienced paddy cultivator, - one, too, who had had personal contact with students from the school and who bore testimony to their practical worth.

Mr. Burrows on Saturday gave another specimen of his remarkable powers as a skilful as well as lively speaker. "Skilful" is scarcely sufficient—"brilliant" would be more suitably applied to portions of his rapid speech which were filled with robust humour. Mr. Burrows knows how to be immeasurably entertaining while telling you nothing at all; and this is anything but a fault in an official who is barred from unfolding state secrets. But his audience can sometimes barely keep up with him. Speaking on his pledged secrecy with regard to the verdict of the Committee on the Agricultural School he brought out the following:—"If I were to reveal to you one morsel of their verdict, I suppose I would be condemned to death by sealing-wax, choked up with red-tape, or swept out of existence by whatever other form of electrocution the Government are accustomed to use." But his listeners had not properly assimilated this rich mouthful before the speaker had got on to more serious stuff, and neither laughter nor applause were forthcoming in time!

Of the other speakers we have already referred to Mr. Elliott. Mr. Harward once more gave a clear, concise and instructive speech which was specially welcomed as from one who knew more about the Agricultural School, perhaps, than any one present—the Principal, of course, excepted. And that Mr. Harward should publicly state his conviction that all he had seen went to show that Mr. Drieberg had "done his very best" must have been the most gratifying testimony to the zealous, enthusiastic and indefatigable head of the only Government Agricultural Institution in our isand. The Mayor closed the prize-giving proper with a short speech, referring especially to the progress of Veterinary science and practice in the island through the medium of the school. The rest of the proceedings partook of a social nature.

RAINFALL TAKEN AT THE SCHOOL OF AGRICULTURE DURING THE MONTH OF FEBRUARY, 1900.

1	Thursday ..	Nil	16	Friday ..	·51
2	Friday ..	Nil	17	Saturday ..	·32
3	Saturday ..	Nil	18	Sunday ..	Nil
4	Sunday ..	Nil	19	Monday ..	Nil
5	Monday ..	Nil	20	Tuesday ..	Nil
6	Tuesday ..	Nil	21	Wednesday	Nil
7	Wednesday	Nil	22	Thursday ..	Nil
8	Thursday ..	Nil	23	Friday ..	Nil
9	Friday ..	Nil	24	Saturday ..	Nil
10	Saturday ..	Nil	25	Sunday ..	2·51
11	Sunday ..	·4	26	Monday ..	·16
12	Monday ..	Nil	27	Tuesday ..	Nil
13	Tuesday ..	Nil	28	Wednesday	Nil
14	Wednesday	Nil	1	Thursday ..	Nil
15	Thursday ..	Nil			
				Total..	3·50
				Mean..	·13

Greatest amount of rainfall in any 24 hours on the 25th inst. was 2·51 inches.

Recorded by Mr. J. A. G. Rodrigo.

PRACTICAL HINTS TO HORSE OWNERS.

By A. Chinniah, G.B.V.C.

(*Continued.*)

Partition.—There are many materials that are used for partitioning stables. The best of them is a brick wall partition. The next in order comes thick wooden planks. I have noticed in some stables cadjan partitions and thin board partitions, but these are frequently the causes of accidents. But any material may be used which answers the purposes, which is durable and is a bad conductor of heat or cold. Whitewashing the walls should be periodically done and glaring colours should be avoided as far as feasible. A light blue or green tint is to be preferred. Tarring the walls is resorted to by some stable owners, and this is undoubtedly a good thing, especially in stables where there are more than one animal. In cases of contagious diseases such

walls are less liable to contamination. In big stables it is usual for the sake of convenience to have temporary partitions slung upon on chains or iron bars; in such establishments these partitions are less costly and are of great practical use when carefully managed.

Space.—The space allowed for a single horse should not be below 12 feet by 12 by 16 feet. The passage into the stable ought to be broad and high, and if doors are used they must be very simple in construction and should always open outside. If bars be used they must be strong and so fitted as to be easily removed.

Roof.—A tiled roof is probably the best. If galvanized iron is preferred it is very essential to have a wooden ceiling so constructed as to allow the free circulation of air between the roofing and the ceiling.

Ventilation.—The ingress and egress of atmospheric air must be well regulated. It is an undoubted fact in the animal economy that the proper ventilation forms one of the main features that go to contribute to the health and comfort of the creature. This is in many cases ignored, and hence the animal suffers from mange and other skin diseases, inflammation of the eye membrane, &c. The door or the entrance to the stable is of course the chief means of ventilation.

In addition to the door there must be a window opposite to the door and at a height just above the head of the animal. And just below the window there should be a floor ventilator. Square pieces 2 x 2 feet of earthenware ventilators are generally used. In some instances galvanized iron is used. Let any material be used, but care must be taken that the free passage of air does not become interrupted, while at the same time there should be no possibility of reptiles creeping in. Floor ventilation is invariably neglected in Ceylon, but it is of the greatest importance as being the means of carrying off the heavy foul air which otherwise requires a high temperature to make it rise to the level of the window or upper ventilators. Further, it dries up the floor and keeps the stable sweet.

The Window.—It is necessary as already stated to have the window just above the head of the horse. It should also be so constructed as not to admit of bottles and other articles being placed on the ledge. I have heard instances where the horses were burnt to death by such lamps placed on the window ledge falling on the bedding. The wings of the windows should be made to move horizontally on two sockets, so that it may open and close according to the direction of wind.

THE CLASSIFICATION OF FIBRES.

(Continued.)

In this arrangement I have separated the fibrous substances derived from plants into five groups, according to their use in the plant economy, as well as in relation to part of the plant employed. The first and third groups follow the natural division of the two great vegetable kingdoms into exogenous and endogenous plants; the second group confined wholly to the first division, but only fibrous in a sense; the fourth group pertaining to both, but more largely confined to the first division, while the fifth group is comprised of low orders of plants that are not fibrous at all, but which are chiefly used as cheap substitutes of better packing materials. The classification is as follows:—

A. Fibro-vascular Structure.

1. *Bast Fibres.*

Derived from the inner fibrous bark of decotyledonous plants or exogens or outside growers. They are composed of bast cells, the ends of which overlap each other so as to form in mass a filament. They occupy the phloëm portion of the fibro-vascular bundles, and their utility in nature is to give strength and flexibility to the tissue.

2. *Woody Fibres.*

(*a*) The stems and twigs of exogenous plants, simply stripped of their bark and used entire, or separated into widths, for weaving or plaiting into basketry.

(*b*) The entire or subdivided roots of exogenous plants, to be employed for the same purpose or as tie material, or as very coarse thread for stitching or binding.

(*c*) The wood of exogenous trees easily divisible into layers or splints for the same purposes, or more finely subdivided into thread-like shadings for packing material.

(*d*) The wood of certain soft species of exogenous trees after grinding and converting by chemical means into wood pulp, which is simple cellulose, and similar woods more carefully prepared for the manufacture of artificial silk.

3. *Structural Fibres.*

(*a*) Derived from the structural system of the stalks, leaf stems, and leaves or other parts of monocotyledonous plants or inside growers occuring as isolated fibro-vascular bundles and surrounded by a pithy spongy, corky, or often a soft succulent cellular mass covered with a thick epidermis. They give to the plant rigidity and toughness, thus enabling it to resist injury from the elements, and they also serve as water vessels.

(*b*) The whole stems, or roots or leaves or split and shredded leaves of monocotyledonous plants.

(*c*) The fibrous portion of the leaves or fruits of certain exogenous plants when deprived of their epidermis and soft celluar tissue.

B. Simple Celluar Structure.

4. *Surface Fibres.*

(*a*) The down or hairs surrounding the seeds, or seed envelopes of exogenous plants, which are usually contained in a husk, pod, or capsule.

(*b*) Hairlike growths or tomentum, found on the surfaces of the stems and leaves or on the leaf buds of both divisions of plants.

(*c*) Fibrous material produced in the form of epidermal strips from the leaves of certain endogenous species, as the palms.

5. *Pseudo-fibres, or false fibrous material.*

(*a*) Certain of the mosses, as the species of Sphagnum for packing material.

(*b*) Certain leaves and marine weeds, the dried substance of which forms a more delicate packing material.

(*c*) Seaweeds wrought into lines or cordage.

(*d*) Fungous growths, or the mycelium of certain fungi that may be applied to economic uses, for which some of the true fibres are employed.

The bast fibres, derived from the bark of exogenous plants, such as trees, shrubs, the climbing vines, herbaceous vegetation generally, are clearly defined, and the fibres of all species of such plants, when simply stripped, are similar in form as to outward appearance, differing chiefly in colour, fineness and strength. An example of a fine bast fibre is the ribbons or filaments of hemp, and of a coarser form, the bast from the linden or cedar. A variation in form should be noted in the lacebarks and the paper barks, where the bundles of fibres which interlace may be peeled off in the form of thin, flat strips. The woody fibres are only fibrous in a broad sense, as their cellulose is broken down and all extraneous matter removed by chemical means, as for the manufacture of paper pulp or of artificial silk. The greater number are merely wood in the form of flexible slender twigs or osiers that are useful for making baskets; or the larger branches may be split or subdivided into strips, withes, or flat ribbons of wood for making coarser baskets. The softer woods still further subdivided give the product known as excelsior, which can only claim a place in a list of fibre plants, because it is a substitute for upholstery or packing material. Structural fibres are found in many forms, some of which may be enumerated as follows:—The stiff, white or yellowish fibres forming the structure of all fleshy-leaved or aloe-like plants, as the century plant, the Yuccas, Agave, and pineapple or the leaf trunk of the banana, as an example, rival hemp of commerce; the coarser bundles of stiff, fibrous substance which gives strength to the trunks, leaf, stems (mid-ribs and veins), and even the leaves of palms, a good example being Piassaba, derived from the dilated margins of the petioles of a palm, where they clasp the stem, these are made into thin strips which afterwards split into smooth, cylindrical fibres. Another example is the stiff fibres extracted by maceration from the "boots" or basses of the leaf stems of the cabbage palmetto, or the shredded leaves of the American fan-palm, known as Crinvégétal. Other familiar examples may be noted in strips rattan, the fibrous material derived from bamboo, from the cornstalk, the flower stems of broom corn, and from reeds sedges, and the true grasses. Still another form is the fibrous mass surrounding the fruit of the coconut, known as coir, and as a curious example may be noted the fibre from pine needles, a notable exception of a structural fibre derived from an exogenous plant, the fibrous mass filling the sponge cucumber being another.

MODERN AGRICULTURAL SCIENCE.

(Concluded.)

But, every thing comes to him who waits, and at last the time came when the doctrines of the New Soil Science could be tested under the most favourable conditions. The post of land agent on Lord Rosebery's Scottish estates became vacant, and Mr. Drysdale, the gentleman who was appointed to that highly-responsible post, was an old pupil of Mr. Hunter's. Mr. Drysdale was wholly unfettered by any feeling of blind loyalty to orthodox doctrines in agricultural science, and, after carefully examining for himself the later developments in the New Soil Science, he came to the conclusion that it was desirable to have these new ideas put to the test in actual farm practice. He accordingly commenced experimenting on a small scale in various fields, and with such satisfactory results that, with the cordial approval of Lord Rosebery, it was decided to extend the work. In the Spring of 1895, therefore, a thoroughly well-equipped experimental station was established on his Lordship's farm, at Dalmeny Park, with Mr. Hunter as scientific adviser, the practical work being under the personal supervision of Mr. Drysdale himself. Part of the station was devoted to testing the relative productiveness of different varieties of grain, potatoes, &c., another part was devoted to bacteriological research work, and the remainder of the station was worked as a miniature farm on the four-course rotation, each section being subdivided into sixteen plots, which were all differently manured on a regular system. A good-sized volume would be required to detail the results, which have been most consistent throughout, obtained at this station in the last four years, during which time the station has been annually visited by hundreds of deeply-interested agriculturists. A few of the more notable results, may, however, be briefly summarised. In the first season the beneficial results of a small dressing of ground lime were so marked that the system of applying to every field on the farm an annual dressing of 4 cwts. of lime was commenced, and has been continued ever since. In order that the small dressing should be equally distributed over the soil, Mr. Hunter procured ground lime, *i.e.*, ordinary burned lime shells mechanically ground to a fine state of division. At first this ground lime was applied in the compost form, but the second year's experience showed that it was equally effective and less costly when applied direct in the hot state when the land was being worked, the small quantity of hot lime applied being insufficient to injure the nitrifying and other soil organisms, besides being rapidly converted into the carbonate form when worked into the soil. It was also found that when the lime required by the nitrifying and other soil organisms was thus supplied, the plots which had received their nitrogen in the form of sulphate of ammonia showed much better crops, alike as to quantity and quality than were obtained from plots which got their nitrogen in the form of nitrate of soda. Mineral superphosphate, supplemented in the case of the potato and root crops with fermented bones, proved the most satisfactory form of phosphate. The Dalmeny experiment also emphasised the importance of potash for every crop, particularly the leguminous, potatos, and root crops. With a moderate dressing of farmyard manure, supplemented with 4 cwts. ground lime applied at the working of the land, and followed by 4 cwts. superphosphate, 1 cwt. fermented bones, 2 cwts. of kainite and 1 cwt. of sulphate of ammonia, the Dalmeny Home farm produces crops which are the admiration of all who see them. Another most important branch of investigation was in regard to the destructive pest of finger-and-toe in turnips,

a pest which had previously baffled the skill of experimenters. The Dalmeny experimenters knew that a heavy dressing of caustic lime would kill the germ of finger-and-toe, but it would also kill the nitrifying and other advantageous soil organisms, while, on the other hand, a small dressing of 4 cwts. per acre would be insufficient to kill the disease germ. They therefore steered a middle course so as to avoid the Scylla on the one hand and the Charybdis on the other, by applying one ton of ground lime per acre when the land was being ploughed in the autumn, and another ton per acre when the land was being worked in the spring. In this case they rigidly avoided the use of dissolved phosphates and used undissolved phosphates supplemented with 8 cwts. kainit and 1 cwt. sulphate of ammonia. This treatment proved a complete success, and the root crops grown by this system on infested soil were found to be sound and good, while those grown on the same soil under different treatment were so rotten as hardly to be worth removing. It was noted, however, that though this treatment was successful in eradicating the disease, the crop was decidedly smaller than that grown on uninfested land to which only a tenth of the same amount of lime had been applied. A word in conclusion may be added as to the far-reaching effect of the Dalmeny experiments. When these experiments were commenced, ground lime for agricultural purposes had never been heard of, whereas now there are at least six lime works where extensive grinding 'plant' is kept hard at work to supply the ever-increasing demand for that substance. Since the principles of the New Soil Science have been put in successful practice at Dalmeny, the scientific authorities, who at first had branded these principles as absurd heresies, have changed their tune, and in the recently-published volume of the Highland Society's Transactions, the chemical adviser of that society has unreservedly declared his acceptance of these new doctrines. Great credit is due to Lord Rosebery for not only providing the means of carrying on this important research work, but also for throwing his home farm and experimental grounds open for the inspection and information of agriculturists.

[*Note by the Editor Agricultural Magrzine,*—"Years before Hellriegel announced his discovery in 1886, Messrs. Hunter and McAlpine were teaching the same fact to their students, as the lecture notes of any of their students at that time can testify." As a student both of Mr. John Hunter, one of the extra-mural teachers of Agricultural Chemistry, and Professor McAlpine, the popular lecturer on Botany at Minto House, we can fully endorse the above from our personal experience as well as from our 'lecture notes,' and it gives us very great pleasure to press the claims of our old teachers in Edinburgh to the discovery, as indeed we did in the pages of the *Agricultural Magazine* as soon as we read of "Hellriegel's discovery" shortly after our arrival in the Island. To us the "new theory" was familiar enough from acquaintance gained in the class-rooms at Edinburgh."]

THE SOLUBLE MINERAL MATTER OF SOILS.

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(*Concluded.*)

If in the piece of granite referred to in the beginning of this paper the rain water had not been allowed to wash out the soluble matter as it was formed, there would have been found a quantity of white salt in the rock powder and in the resultant soil. If the quantity of this white salt had been great, as much as 2 or 3 per cent of the weight of the rock, it would have been difficult or impossible to get a plant to grow in the soil. This has been the experience the world over, that plants will not grow in a soil that contains too much soluble matter.

In arid countries there is not sufficient rainfall to remove all of the soluble matter as it is formed in the decay of rocks and soils, and the result is an accumulation of salts within the soil. In still other parts of the country, where more rain falls, the salts may be washed out, but the solution runs down into inclosed basins having no connection with the ocean, and there evaporates, depositing the salts. In either of these cases plants suffer when the amount of salts reaches a certain per cent. It can safely be said that few crops can flourish when soluble matter amounting to one-half of 1 per cent of the weight of the soil is in solution around the soil grains when the soil is saturated with moisture. As the water of saturation weighs from 25 to 75 per cent of the dry weight of the soil, it will be seen that crops will not thrive when the solution contains more than 1 per cent of the soluble matter. When the concentration of the soil solution reaches this per cent, the leaves of alfalfa turn yellow, wither, and die, just as the plant would do if drought prevailed.

In arid regions where the amount of rainfall is small, the amount of water which leaches through the soil is not sufficient to wash out all of the soluble matter. For this reason the amount of soluble matter in the western soils exceeds the amount of soluble matter in the eastern soils of the United States. The following table shows the relation between the amounts of soluble matter in the soils of different parts of the country :—

Relative amounts of salts in soils.

Kind of soil.	Locality.	Per cent soluble matter.	Pounds soluble matter per acre-foot.
Prairie ...	Kansas, Nebraska ...	0·033	1,155
Limestone ...	Virginia, Maryland, Pennsylvania, Kentucky ...	·017	595
Gneiss ...	Virginia, North Carolina	·077	245
Truck ...	Maryland, Virginia, North Carolina ...	·006	210
Subtropical.	Florida ...	·0012	42

The prairie soils throughout the West show large amounts of soluble matter, and they are exceedingly productive when enough rain falls to keep the soil in a moist condition. Of the soils of the humid regions, those formed from limestone show the greatest percentage of soluble matter. In general,

it will be found that in the humid regions of the United States the percentage of soluble matter depends upon the size of the soil grains. The soils of the humid regions vary much in size of grain and extent of surface exposed on these grains upon which the water may act. The following table shows the relation in a general way between the texture of the soil and the percentage of soluble matter present.—

Relation between texture of soils and percentage of salt.

Kind of soil.	Locality.	Relative extent of surface of gr. ins.	Percentage of salt.
Florida soils ...	— ...	1	1
Truck ,, ...	— ...	5	10
Limestone soils...	Maryland ...	18	6
Do ...	Pennsylvania...	33	27
Do ...	Kentucky ...	55	17
Do ...	Virginia ...	56	78

It will be seen from the table that the soil which had the greatest extent of surface for the water to act on (or, in other words, the soil which was made up of the finest grains) had also the greatest percentage of salt which was soluble. It is a well-known fact, also, that the general agricultural value of a soil varies in nearly this same ratio, that is to say, a heavy soil is better for general farming purposes than a light, sandy soil.

There is another point of difference between the humid and arid soils which is of general interest as well as of general importance. The soils of the humid regions contain much more soluble matter than the subsoils, that is to say, the greater part of the soluble matter is concentrated within the surface foot of the soil. About 50 per cent of the rainfall of the humid regions either washes over the surface of the ground or else washes through the soils and skins down below the subsoil to appear at a lower level and be carried off by streams into the ocean. This has been going on for ages, and the amount of soluble matter left is very small, only sufficient to supply the plant roots.

The absorbing action of the soil grains retains the greater part of the salt as it becomes soluble within the surface foot of the soil, and it is here used by the plants. Below this, in the subsoil, in the region where the action of weathering is reduced to a minimum, the amount of soluble matter found is very small.

In the arid regions, where the rainfall is not sufficient to keep the soil continuously moistened to any great depth, and where the air is drier and evaporation much more rapid, the proportion of the rainfall drained from the land by the rivers is much less, in some cases less than 10 per cent, and in nearly all cases of Western rivers less than 25 per cent. Thus, with a small rainfall, very little water leaches through the soil, and therefore very little soluble matter is washed out.

In fact, in most of our arid prairies the soil is never wet from the surface to a depth of more than 5 or 6 feet. When the rainfall soaks down to the subsoil it carries with it some of the soluble matter which is in the soil. This soluble matter is absorbed by and condensed upon the grains of the subsoil, and when the water is again brought to the surface of the ground by the evaporation of the soil water, part of the soluble matter remains in the lower layers of the soil. Then, if an examination is made of the prairie soils as they normally occur, more soluble matter will be found in the subsoil than in the soil, while in the humid regions the conditions are just the reverse.

BORACIC ACID AS A FOOD PRESERVATIVE.

Boracic or boric acid and its sodium salt Borax are now extensively used for the preservation of liquid and solid foods such as milk, butter, cream, fish and meat that a short account of them should prove of general interest. We are indebted for our facts to an instructive paper on this subject by Prof. Brünnich, F.C.S.

In all preservatives sold, boric acid and borax are the chief ingredients. Analyses of some of these preparations are given below :—

Preservitas contained :

Water	...	34·50	per cent.
Soda	...	5·58	,,
Boric acid	...	47·39	,,
Salt	...	9·33	,,
Saltpetre	...	3·00	,,
		99·80	

Sal praeservare contained :

Water	...	34·30	per cent.
Soda	...	4·96	,,
Boric acid	...	51·80	,,
Salt	...	8·52	,,
		99·58	

Preservative contained :

Water	...	37·70	per cent.
Boric acid	...	40·60	,,
Salt	...	20·16	,,
Saltpetre	...	3·03	,,
		101·49	

Preservative contained :

Water	...	39·30	per cent.
Boric acid	...	57·26	,,
Soda	...	4·35	,,
		100·91	

The effect of boric acid and borates on man and animals has been studied by a great number of scientists, but the results of their investigators are by no means conclusive. Some of the investigators—for instance, the French Commission appointed to study the influence of boracic acid on the human system—found that it could be taken for a considerable time without injurious effects. More recent experiments proved that small doses of boric acid, or borax, have no injurious effects, whereas larger doses produce distinct physiological disturbances—a danger will consequently arise if boric acid is used indiscriminately as a preservative. The Medical Officer for Health for East Kent, Dr. M. K. Robinson, has

shown that a serious outbreak of illness, by which five out of the seven inmates of a house were suddenly attacked, was due to a repeated addition of a preservative containing boric acid. Milk was at once suspected, being not only taken by itself, but also with tea and in a blanc-mange. It was found that the cook added preservative to the milk, which already contained boric acid when delivered by the dairyman. The result was that, by using the preservative twice, over-doses of boric acid had been administered. The remainder of the blanc-mange was given to nine fowls, of which five died; the rest suffered badly, but recovered. Dr. Robinson states that the addition of the drug should be regarded as an injurious adulteration. If such results, he says, can be produced in the case of adults, it is not unreasonable to presume that infants cannot take with impunity long-continued doses in their staple food. The opinion is general among physiologists that all reservatives, when effectual, either from their nature or quantity, in so injuring the micro-organisms which bring about fermentation or putrefaction of food as to inhibit their action, also injure those persons who consume such food. If a preservative substance can so influence the proto-plasmic intergrity of bacteria and other low forms of life as well as of the higher forms like ordinary plants, it is difficult to conceive that the same basis of life-tissues in animals, especially that of the mucous membrane of the alimentary canal, should not also be be injuriously affected, to say nothing of those beneficial bacteria concerned in the digestive processes. In 1897, a "Lancet Special Sanitary Commission on the use of Antiseptics in Food" was appointed, and consulted eminent members of the medical profession, as, for instance, Sir Benjamin W. Richardson, Sir Henry Thompson, Dr. Lauder Brunton, Dr. Pavy, Dr. F. J. Allen, and others on the subject. In spite of a great difference of views expressed by the various authorities, they all agree in stating that the antiseptics taken continuously in food, in sufficient qantity, are injurious to health, and they all insist that the name and the quantity of the antiseptic used should be stated on a label attached to the article when sold. Some of the medical men demand a restriction on the amounts of preservatives used; others again wish for a complete prohibition of the use of antiseptics. By the laws of Germany, France, Belgium Switzerland, Italy, and most other countries, the addition of preservatives to goods is absolutely forbidden. In England, although an Adulteration Act has been in existence for a long time, no direct action to prevent the use of antiseptics has been taken; and only recently, since 1898, numerous convictions have been obtained for the addition of boric acid to milk and butter at a great many places.

The *National Provisioner*, Chicago, 4th, 11th, and 18th February, reopens the question under the heading, "Is Boracic Acid Deadly?" and numerous evidence is given to show that the drug is not deadly, which no one hitherto had tried to prove. But nothing new is brought forth, and some of the statements, as, for instance, that 10,000,000 lb. of cured meat treated with borax are eaten annually in Germany, and over 100,000,000 lb. in England, have to be taken with more than the proverbial grain of salt, considering that the adulteration law is carried out so very strictly in Germany.

The conclusions to be drawn from the foregoing remarks are very simple. Sooner or later the use of boracic acid (although it is not a deadly poison) as a preservative will be everywhere greatly restricted, if not entirely prohibited. There is not the slighest doubt that milk, butter, meat, fish, &c., can be preserved without the use of drugs. Cold storage is the simplest modern method of preservation of foods, and is applicable with equal advantage on a small or on a large scale. If, with cold storage as preservative, a previous scrupulous care as to cleanliness, inspection of meat and dairies, modern processes, such as pasteurization, &c., go hand in hand, our products such as meat, butter, and other foods can compete successfully with the products of other nations in the world's market.

GENERAL ITEMS.

Too much care cannot be exercised in taking up a young tree for the purpose of transplantation. If it be taken up roughly many of the young feeding roots will be destroyed, and without these the necessary amount of sap cannot be supplied to the branches and buds, yet the tree will continue to evaporate a large amount of water. The consequence of this evaporation and failure of supply is that the tree will often fail, or will remain for a long time a sickly, struggling object, unless assistance is given by removing sufficient branches and buds to compenstate for the loss of roots. In any case, the damaged roots should be cut off clean with a sharp knife. In taking up the young tree, first remove all the surface soil down to the root system. Then dig a trench round it at some distance from the extremities of the roots. If the weather be dry, it is a good plan to water the roots copiously, to cause the soil to adhere. Then, with a sharp spade, cut under the roots and loosen the boll of earth from that below. The tree may then be safely removed, the tender roots having received very little damage: and if it be carefully replanted, success will be almost assured. In the latter process, the roots should be spread out evenly on a loose bed, and the soil pressed firmly upon all the fibres, thus excluding air as much as possible. The depth at which the young tree is planted will depend upon the nature of the soil in the new location. If the latter is of the same quality as that from which the tree was taken, then the depth should be the same; but if the soil is heavier than the former, then the plant should be set shallower in the ground; and on the other hand, if lighter, then it should be planted deeper. On finally filling in the hole, the surface soil shold be fine and light, because moisture can then not escape by capillarity.

Tomato diseases have become very common of late years, and it therefore behoves every grower of this popular fruit to be able to recognise the early symptoms of various troubles, so that

remedies may be applied before the diseases have obtained a strong foothold. Root knot is generally caused by ellworms, which form galls, or irregularly swollen diseased growths on the roots, resulting in the wilting and death of affected plants, which should be burned, the soil in which they have been grown being either carefully burned or sterilised with quicklime. The sleeping disease of tomatoes, caused by an internal fungus parasite, is surely indicated by the drooping of the leaves successively from the base of the plant upward, increasing day by day, and sometimes accompanied by discoloration. At this stage the woody parts of a split root show a dingy yellowhis-brown hue, more pronounced five or six hours after being cut open. Infested plants should be burned, and the soil in which they have been growing cleared out and sterilised by being mixed with quicklime. In cases of tomato-blight, the fungus-infested foliage shows rusty, yellowish spots, and the edges of the leaves often curl downwards before the foliage shrivels and dies, leaving the stems bare. Spraying with Bordeaux mixture directly the first indications of disease are observed, and the removal of the badly affected plants, are effective remedial measures. The tomato-rot-fungus generally attacks only over half-grown fruits, the first symptoms being the appearance at the blossom end of a small black spot, rapidly increasing in size until half the affected fruit is sunken, black, and destroyed, the injury usually extending uniformly from side to side across the tomato. The crop also suffers from a physiological trouble, a kind of tomato dropsy, visible in swellings on both leaves and stems, and in the curling of the former. This disease results from an excess of water in the tissues of the plant, and is encouraged by insufficient light, and by injudicious watering, especially in dull weather.

A method of fertilising fruit trees in vogue in Holstein is suggestive, and not unworthy of a trial. The trees, it is said, receive no cultivation, and the fruit is large, sound, and produced in abundance. Every two years a few holes are dug iu the ground about 4 or 5 feet from the trunk of the tree, and about 1 foot deep, closer and shallower in the case of young trees. These holes are filled with liquid manure about four times during the winter months, and for young trees this is diluted with water. If there is more liquid manure than is wanted, it is distributed over the surface of the orchard, using an old street sprinkling-waggon for the purpose. There is no reason why manure water should not be used once or twice after it is seen what the crop is likely to be; of course, not affording any at that season to trees not bearing a crop, or which are carrying only a few fruits, as to dose them would be to encourage, probably, an unnecessary growth of shoots. But in this matter, the cultivator must be guided by the condition of the trees and of the soil.

A noteworthy milking record has been established by the Red Poll cow Crocus, which belonged to the famous Norfolk dairy herd at Whitlingham. She gave birth to her third calf on May 11, 1890, since which date she continued uninterruptedly in milk till September 28, 1899, a period of over nine years, her milk yield in the last week of her life being at the rate of 43¾ lb. or nearly 4½ gallons. During the nine years four months that she was continuously in milk she yielded altogether 50,428 lb., or nearly 23 tons of milk. Over the last five years the average quantity of butter fat in her milk was as high as 4·3 per cent. Her live weight when sent to market, after being on grass feed for the last six months of her life, was 10 cwt. 1 qr. 11 lb. In the nine years since her last calving she gave something like 45 times her own weight in milk, and her average production during that period was 5,403 lb. of milk, or considerably over 500 gallons per annum. For a moderate sized cow this is a remarkable performance which has aroused much interest amongst the breeders of Red Polls.